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Number 8

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AUTOMOTIVE INDUSTRIES

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NEW YORK—THURSDAY, AUGUST 23, 1923

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1923 Exports Will Be Double 1922 Totals

Six months' figures indicate that more automotive products will be sold abroad than in the peak year of 1920. Truck business is three times as great as in 1922. Car sales double. Tires meet keen competition. Parts distribution grows very rapidly.

By Norman G. Shidle

AUTOMOTIVE export business for 1923 will be more than double that of 1922 if the figures for the first six months can be taken as a criterion. The number of cars shipped abroad from the United States and Canada during the first half of this year was more than twice as great as shipments in a similar period last year. Truck exports tripled and the value of parts increased 50 per cent, but that of tires made only a very slight gain.

The following tabulation shows the situation very clearly.

Exports from United States and Canada
(January to June inc.)

	1922	1923
Passenger cars..	45,215	94,207
Trucks	5,762	15,780
Parts	\$19,681,125	\$30,092,329
Tires	\$10,390,397	\$11,948,457

To get a complete picture of American vehicle export business for the first half of 1923, Ford foreign assembly figures should be added to the United States and Canadian car and truck total of 109,987. Ford foreign plants put out 49,712 vehicles between Jan. 1 and June 30, 1923, thus making a grand total of 159,699 American vehicles sold in foreign countries during this period.

United States and Canadian vehicle exports for half of 1923 are more than double those for the entire year of 1921. There is every indication that the peak business of 1920 will be surpassed by the final figures for 1923 when they are compiled next January.

Predictions of this kind are always a bit dangerous, but the facts are fairly clear in this instance. In 1920, 142,508 passenger cars were exported from the United States alone, while 64,945 were shipped in half of 1923. Assuming that business for the last six months is equal to that of the first six (in 1922 the last half of the year yielded greater business than the first) the 1923 passenger car total will amount to about 130,000.

WHILE it is some 12,500 short of the 1920 mark, it must be remembered that the proportion of shipments from Canada is growing, as more American firms have assembly plants there now than in 1920. In the 12 months of 1920 about 20,000 cars were shipped from Canada, as against 29,262 in half of 1923. Projecting the whole year on the same basis as before this would make the 1923 total for Canada about 60,000, which is 40,000 in excess of the 1920 figure.

Combining these two sets of data, as is necessary to

United States Gasoline Passenger Car Exports, 1923 (January-June Inclusive)										Canadian Passenger Car Exports 1923 (January-June Inclusive)		
	Up to \$500		\$500 to \$800		\$800 to \$2,000		Over \$2,000		Total		No.	Value
	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value		
January.....	2,099	\$664,237	1,825	\$1,321,798	1,916	\$1,996,626	204	\$596,887	6,044	\$4,579,548	4,666	\$2,530,005
February.....	3,068	1,045,880	2,918	1,930,058	2,652	2,746,044	210	551,889	8,848	6,273,871	5,668	3,964,345
March.....	5,187	1,874,678	2,521	1,718,999	3,895	4,080,152	211	543,447	11,814	8,217,276	6,426	3,228,915
April.....	6,365	2,077,274	2,567	1,696,232	4,184	4,347,139	236	662,604	13,352	8,783,249	4,436	2,294,802
May.....	6,115	2,245,117	2,269	1,526,966	3,846	4,030,908	270	731,274	12,500	8,534,265	3,427	1,893,211
June.....	5,231	1,925,885	2,672	1,783,864	4,198	4,469,099	286	792,979	12,387	8,971,827	4,639	2,171,357
Total.....	28,065	\$9,833,071	14,772	\$9,977,917	20,691	\$21,669,968	1,417	\$3,879,080	64,945	\$45,340,036	29,262	\$15,082,635

get a proper picture of American exports, a gain of 27,000 cars over 1920 is indicated for 1923.

In round numbers, the following table shows the situation as it stands:

Passenger Car Exports

	1920	1923	1923
	(1st 6 mo.)	(12 mo. est.)	
U. S. and Canada.....	163,000	95,000	190,000
United States.....	143,000	65,000	130,000
Canada	20,000	30,000	60,000

The table brings out clearly the increasing importance of American assembly plants in Canada. In 1920 only about 12 per cent of American exports went from Canada, while in the first half of 1923 Canadian plants accounted for 32 per cent.

The gain in passenger car exports this year means that American manufacturers will do a gross foreign business of nearly \$121,000,000, which is about \$49,000,000 in excess of 1922. Vastly increased profits will accrue despite the descending average value of exported cars. The approximate average value of cars shipped from United States and Canada since 1920 has been:

1920	\$1,090
1921	960
1922	720
1923	640

If 1923 business holds up throughout the year, as there is every indication that it will, the total value of cars sent abroad will reach 85 per cent of the 1920 total, despite the fact that the average value of the units shipped in 1923 is only 59 per cent of what it was in 1920.

These figures point to a trend which seems likely to continue indefinitely. Foreign markets are developing so rapidly that increased quantity can be depended upon to take care of decreased unit returns, particularly since no such major decrease in average prices is likely to occur again as took place between 1920 and 1923.

That there is some difference in the average wholesale price of cars produced in the United States as compared with those shipped abroad is shown by the following table, which has reference to the year 1922:

	Average wholesale price
All cars produced in U. S. and Canada..	\$650
Cars exported from United States.....	760
Cars exported from Canada.....	595

These figures give evidence of the predominance of Ford, General Motors, and one or two others in the Canadian exports, and show that most of the high-priced cars are shipped from the United States.

The truck situation, as related to 1920 business, can best be summarized in tabular form:

	Truck Exports		
	(1st 6 mo.) (12 mo. est.)		
	1920	1923	1923
U. S. and Canada.....	34,000	15,800	32,000
United States.....	30,000	11,600	23,000
Canada	4,000	4,200	9,000

This analysis shows that truck exports have not come back so strongly as passenger cars, but that total business for this year will not fall far short of the previous high-water mark. This really is a remarkably good showing in view of the overwhelming number of unfavorable surveys that have been coming in from every part of the world. Study of the figures proves again that facts often tell a somewhat different story than mere general statements.

A closer look at the dollars and cents value of truck export helps to impress this point even more strongly. During six months which have been filled with doleful reports of excess war trucks and markets still glutted with the overshipments of 1920 and 1921, American truck manufacturers have received \$8,209,767 for commercial vehicles sold in foreign lands.

From the United States they shipped 11,578 trucks,

United States Truck Exports, 1923 (January-July Inclusive)

	Up to 1 Ton incl.		1 to 2½ Tons		Over 2½ Tons		Total	
	No.	Value	No.	Value	No.	Value	No.	Value
January.....	1,095	\$353,797	205	\$266,264	52	\$120,636	1,352	\$740,697
February.....	1,302	467,051	322	439,084	74	186,265	1,698	1,092,400
March.....	1,130	649,360	367	426,335	67	170,580	1,564	1,246,075
April.....	1,740	609,502	406	469,599	84	196,947	2,230	1,276,048
May.....	2,175	687,320	367	411,662	63	137,434	2,605	1,236,416
June.....	1,733	607,915	316	387,456	80	147,665	2,129	1,143,036
Total.....	9,175	\$3,374,945	1,983	\$2,400,400	420	\$959,327	11,578	\$6,734,672

Canadian Truck Exports, 1923 (January-June Inclusive)

	No.	Value
January.....	369	\$141,261
February.....	438	152,587
March.....	883	301,745
April.....	602	211,734
May.....	790	274,241
June.....	1,120	393,527
Total.....	4,202	\$1,475,095

United States Parts and Tire Exports, 1923
(January-July Inclusive)

	TIRES								Parts	Total Value Tires and Parts		
	Casings		Solid		Inner		Total					
	No.	Value	No.	Value	No.	Value	No.	Value				
January	126,180	\$1,378,217	8,031	\$183,793	80,547	\$134,762	214,758	\$1,696,772	\$4,365,121	\$6,061,893		
February	131,586	1,532,309	7,909	190,101	81,277	134,172	220,772	1,856,582	4,602,878	6,459,460		
March	190,468	2,017,424	10,576	257,251	134,141	221,429	335,185	2,496,104	4,780,570	7,276,674		
April	166,865	1,714,702	7,520	184,926	118,996	185,581	293,381	2,085,209	6,012,906	8,098,115		
May	134,667	1,474,989	7,023	178,523	101,306	174,923	242,996	1,828,735	5,639,466	7,468,201		
June	144,556	1,610,050	8,315	186,474	109,481	188,531	262,352	1,985,055	4,691,388	6,676,443		
Total	894,322	\$9,727,698	49,374	\$1,181,368	625,748	\$1,039,398	1,569,444	\$11,948,457	30,092,329	\$42,040,786		

valued at \$6,734,672, and from Canada went 4202 vehicles, valued at \$1,475,095. Both of these figures are big enough to be of considerable importance in the truck industry today.

It is interesting to note, incidentally, that the average value of the trucks shipped from the United States is about \$570, while for Canadian shipments it is only \$350. This seems to indicate that Fords comprise most of the trucks sent from Canada, although price classifications are not available in the official figures. Of the trucks exported from the United States 79 per cent are under 1 ton, 14 per cent between 1 and 2½ tons, and 7 per cent over 2½ tons.

Average Truck Prices Vary

While complete figures for 1923 are not yet available, it is interesting to note that in 1922 the average value of trucks produced and exported varies as follows:

Average Value

Total United States production.....	\$880
United States exports.....	720
Canadian exports	430

This tabulation carries out the assumption made from the passenger car figures, namely, that the low-priced lines predominate in Canadian shipments. There is one difference, however. The average price of all cars produced falls between the average price of cars exported from Canada and of those sent from the United States. The average price of all trucks built, on the other hand, is considerably higher than that of the vehicles shipped from either the United States or Canada.

From this it may be argued that the demand for small trucks in foreign countries is relatively higher than that for low-priced passenger cars, or, vice versa, that high-priced cars can be sold in foreign markets more readily than heavy trucks. The facts of the case, as is well known, bear out these indications given by the figures.

The relatively small increase in tire exports as compared with gains in other automobile lines is a direct reflection of the severe competition to which American tire builders are being subjected in foreign countries. While car business has been doubling and truck business trebling the 1922 values, tire totals have just about been holding their own. This condition probably is due largely to the price war precipitated by certain foreign builders in various markets, the result of which has been extremely difficult competitive conditions coupled with small profits for the manufacturers.

Neither cars, trucks, nor vehicle parts of other kinds have been met with such severe countersales effort on the part of European rivals. With these facts in mind, the tire showing may be considered as relatively good.

England and Australia continue to be the biggest quantity buyers of American automotive products. Both of these areas bought more than \$2,000,000 worth of cars, trucks, parts and tires each month for the first four months of 1923, while the May and June totals were only slightly under that figure.

Norway and Sweden, after buying lightly in January, began to climb rapidly in March, April and May. In the latter month approximately \$1,500,000 worth of automotive products were shipped from American plants to Scandinavia.

The Argentine is buying at about the same rate as Norway and Sweden combined, the monthly average consumption in the big South American republic being about \$1,125,000.

Next in order of prominence come New Zealand, Spain, Mexico and Denmark. New Zealand has been purchasing American automotive products since Jan. 1 at the rate of \$800,000 a month, the monthly averages for the other countries mentioned running about as follows: Spain, \$700,000; Mexico, \$600,000, and Denmark, \$600,000.

Other important buyers of American automotive goods this year have been South Africa and Brazil, each with a monthly average of \$500,000; Cuba with about \$450,000; India with about \$250,000, and Japan with about \$300,000.

Paint Reduces Heat Absorption

ALUMINUM paint applied to the under side of the top of an automobile will greatly reduce the amount of heat absorbed from the sun and re-radiated on the under side, according to a leaflet sent out by the Department of Commerce. If such a paint is used, it is claimed, the temperature beneath the top will be more nearly like that found in natural shade, as under a tree. A still further reduction in temperature could be effected by painting the upper side of the top with a white reflecting paint. The combination of a white upper surface and an aluminum lower surface is the most effective method known of producing a light-weight shield against the sun's rays.

The above recommendations are based on experiments made by Dr. W. W. Coblenz of the Bureau of Standards, who found that the heat transmitted through a shield of the type described is less than half that transmitted through the usual type of automobile top. The ordinary top absorbs about 90 per cent of the heat which reaches it from the sun, and much of this heat is re-radiated on the under side. White paint on top greatly reduces the amount of heat thus absorbed, while the aluminum paint reduces the proportion of the absorbed heat that is re-radiated from the lower side.

New Four-Cylinder Armstrong-Siddeley Added to Six-Cylinder Line

Designed to meet American competition in England. Selling price £400. Has piston displacement of 112 cu. in. and wheelbase of 111 in. Vaned flywheel spokes cause draught and eliminate need for fan. Overhead valves and single plate clutch are used.

By M. W. Bourdon

SINCE the war, Armstrong-Siddeley Motors, Ltd., Coventry, England—who have resources as extensive as any British makers—have specialized on six-cylinder cars. These are high-grade productions, termed 18 hp. and 30 hp. respectively, selling at remarkably low prices on English standards. They are now supplemented by a new model with four cylinders, which also is being offered at a price that will cause it to cut into the market of the medium-priced American cars sold in England, despite its having an engine with a piston displacement of only 112 cu. in. Its standard bodywork is a roomy five-passenger, for the chassis has a wheelbase of 111 in. and a track of 56 in. Fully equipped, with a folding top having detachable side panels that open with the doors and are stored behind the back upholstery of the rear seat, the car is offered at £400.

This new model represents a type of car that is becoming extremely popular in England. It is a full-sized car with an engine of fairly high efficiency, capable of giving quite a good top gear performance with its 4.7 to 1 ratio and 30-in. wheels.

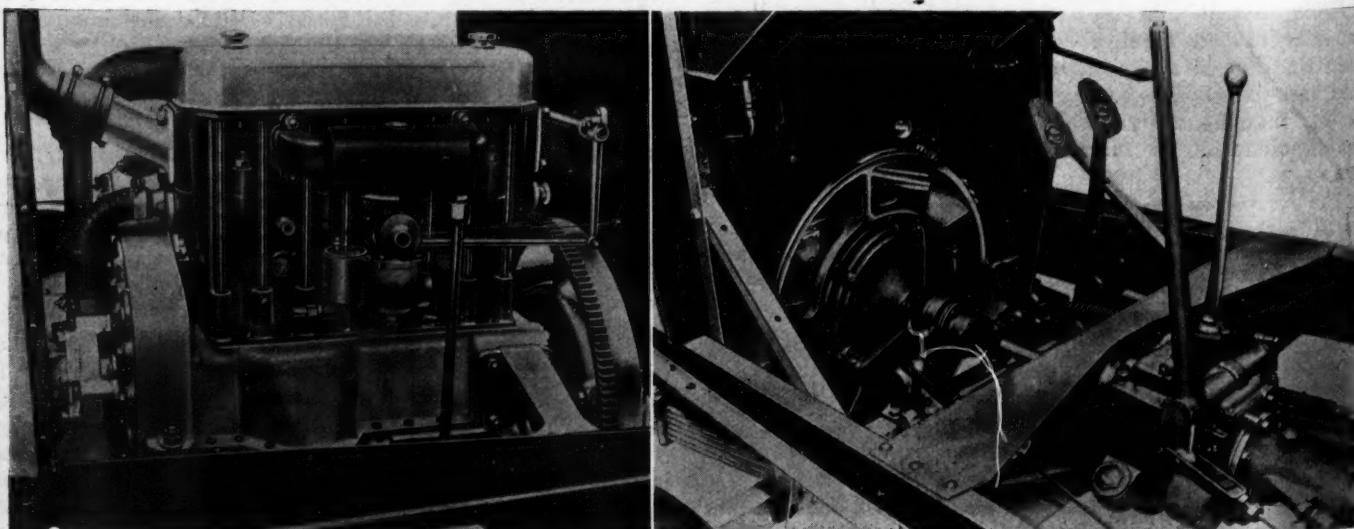
The engine has its cylinders and the top half of the crankcase cast as a unit, with a detachable head in which the valves are operated by pushrods. Lubrication of the overhead valve gear is maintained by oil mist rising through a large breather and oil filling pipe extending into the valve cover, the latter a sheet steel pressing. Three white-metal bearings are used for the crankshaft. The white-metal of the big-end bearings is run directly

into the connecting rods. Aluminum pistons are standard, with three rings, one acting as a scraper.

An unusual feature is a roller chain for the distribution, the same chain rotating the magneto, generator, camshaft and water pump, the generator being mounted eccentrically to provide a means of chain adjustment. The starting motor has a Bendix drive. No fan is fitted, the flywheel spokes being vaned to cause an air draught and the engine space being carefully "sealed" by the hood and underpanning.

The carburetor is a Claudel with a branched and exhaust-jacketed manifold bolted up to the cylinder head, two exhaust connections butting up to ports in the head casting, the outlet being through a separate pipe. Throttle and ignition levers are located below the steering wheel, with quadrants and rods on opposite sides.

A single plate clutch is used, located with the boss of the large diameter vaned-flywheel. Thence the drive is taken through a universally jointed coupling shaft to the three-speed gearset mounted as a unit with the torque tube, an arrangement found on the other models of this make, as also is the vaned-flywheel. The hand brake and gear levers are central. Cables are used for brake actuation, both sets of brakes being within the rear wheel drums, each shoe having a length of friction surface equal to nearly a quarter of the internal circumference of the drum. The final drive is by spiral bevel and the wheels are of a special disk pattern exclusive to this make.



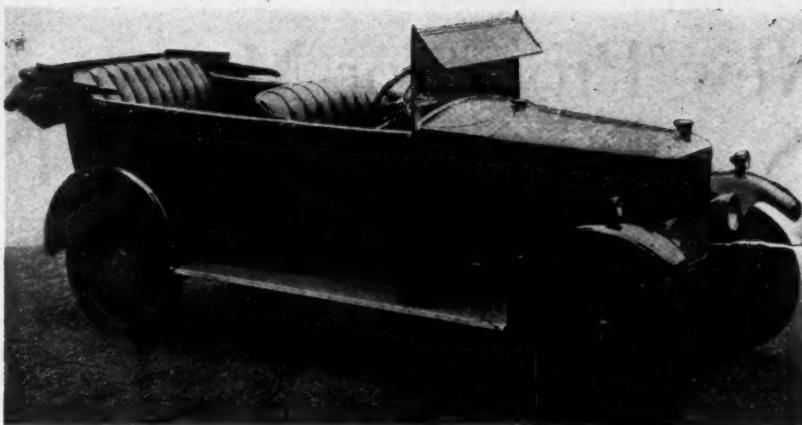
Left side of 14-hp. four-cylinder Armstrong-Siddeley engine.

Center of Armstrong-Siddeley 14-hp. chassis with three-speed gearset integral with torque tube.

In the suspension system an unusual feature is seen in the design and attachment of the rear springs. The latter resemble cantilevers in having forward extensions beyond their thickest part; but these extensions are short and are bolted to a bracket inside the frame, while the thickest part of the spring is held in a rigid clip-bracket which is secured underneath the outer end of a heavy cross-member of the frame and in which the spring is free to slide fore and aft within limits. These springs may be best described, perhaps, as quarter-elliptics with two anchorages to the frame, one at the front end of a short extension; the ultimate effect is to distribute frame stresses arising from spring reaction and load over a bigger area. The front springs are quarter-elliptics.

There are only three cross-members to the straight-side but tapered frame. The first is at the front to support the radiator; the second—a deep and wide unit—in front of the gearset, where it supports the latter, and therefore the torque tube, in a spherical trunnion bearing; while the third is that already mentioned, in line with the main support of the rear springs.

Another unusual feature lies in the steering gear,



New 14-hp. Armstrong-Siddeley with five-passenger body.

which consists of a train of four gears resembling the back gearing of a lathe.

The weight of the car is approximately 2200 lb., from which fact, combined with an announcement that the engine has a power output equivalent to 1½ hp. per cwt., it can be assumed that it will develop something like 30 b.h.p.

New Books Discuss Publicity, Safety and Gliding

RECOGNITION of the extremely important part played by public opinion in the success of any enterprise has given rise to a new field of endeavor, termed "publicity." The art of appealing to public opinion is being practised for the benefit of international, national, political and industrial enterprises and, in fact, all fields where it is desired to bring about an understanding which cannot be obtained in the former more simple way of personal contact.

No matter what one may think of publicity issues, often rightly termed "propaganda," the fact remains that this comparatively new profession is of immense worth. Used correctly it serves a purpose distinct from that served by advertising.

Manufacturers about to undertake large endeavors, such as introducing new products to the trade, are utilizing the field of publicity more and more. Inasmuch as publicity involves specialized problems it is well to know how and how not to apply this powerful tool.

"Publicity," a recent book by R. H. Wilder and K. L. Buell, is a manual intended for the use of business, civic and social service organizations. Its contents should be of service to all organizations contemplating publicity campaigns. This volume tells how publicity work should be carried on and by reference to concrete cases illustrates successful and unsuccessful practice.

OFTENTIMES there grows up in our midst an industrial enterprise in whose history there is real romance. Unless the pursuit of our daily bread brings us into direct contact with it there is little chance that we know much of the enterprise save perchance the stock quotation, the product, or some sidelight of small import.

Such an organization is the Underwriters' Laboratories, Inc. Hardly anyone with native curiosity and power of observation has lived very many years without seeing the hallmark of this concern. But unless one has sent it a safe or automobile lock to be tested the chances

are that one's knowledge of the actual work of the organization is limited.

A history of the Underwriters' Laboratories has recently appeared which gives all the salient facts in an interesting manner. The title is "A Symbol of Safety" and the author is Harry Chase Brearley. A very clear idea of the growth of this institution as well as methods of testing industrial products is presented.

S. ROWLAND HILL, in his "The Handbook of Business Correspondence," covers a broad field by devoting chapters to the organization of a mail sales division, use of dictating machines, and similar subjects.

Realization that letters may be a large factor in building up sales has drawn an ever greater interest in the subject which has shown itself in the parallel development of specialized letter writers. These specialists will find a great deal of valuable material in this new volume, as will others seeking facts to help their correspondence.

This book is one of the most comprehensive volumes ever put out in its field. It resembles the various engineering handbooks in general appearance.

The McGraw-Hill Book Co., New York, is the publisher.

THE success of gliding contests in Germany during the years 1921 and 1922 greatly revived interest in this form of flight and has led to further work of an experimental nature in many countries. A survey of man's efforts to fly by this natural method has recently appeared in England, covering work carried on in all countries from the earliest days until the last successful flight at Itford, England, last year.

"Gliding and Soaring Flight," by J. Bernard Weiss, in addition to the historical material already mentioned, presents the technical aspects of this mode of flying as well as considerations for future development. The volume is published by Sampson Low, Marston & Co., Ltd., London.

New Projector Measures Wide Range of Precision Parts

Bausch and Lomb product designed for visual inspection of screw threads, forms of gear and cutter teeth, and other units of like character. Accuracy of .0001 in. can be attained. Rapid operation is feature. Separate attachment makes photographs.

VISUAL inspection and measurement of a great variety of precision parts and details is made possible by the Contour Measuring Projector, an instrument which has been developed by the Bausch & Lomb Optical Co. It is designed for the optical projection of the different elements of screw threads, forms of gear and cutter teeth and a variety of similar machine elements. Other work for which the projector is suitable includes checking the mesh of mating gears, inspecting the contour of all kinds of small parts, checking gages and detecting distortion due to heat treatment of either parts or gages.

With this instrument it is possible to measure the lead of a thread gage from thread to thread or over a number of threads to an accuracy of 0.0001 in. The instrument gives a simultaneous check as regards root and crest form and angle of thread, and the included angle, as well as the leaning angle, can be measured to within 10 min. of arc. It is very rapid as a comparator, and, according to the manufacturers, five hundred screws can be inspected per

hour for external, pitch and root diameter, shape, smoothness and angle of thread, as well as for width of flat on crest and root. In addition to visual inspection, a permanent record may be made on photographic plates or bromide paper, by means of a separate attachment.

Mounted on Two Columns

As illustrated in Fig. 1, an instrument base with adjustable work carrier is mounted upon two columns, which are secured in a base provided with four casters. Leveling screws are fitted in the feet adjacent to the casters, to permit location in any desired position for the projection of images on a wall or screen for permanent record work. For thread comparison or similar production work a prism is mounted on the front end of the instrument, throwing the image downward to the horizontal table which is mounted adjustably on the front standard. A curtain which is attached at the head may be draped around this table, eliminating the necessity for dark room operation.

The work carrier is an accurately made compound slide, with three hand-operated screw adjustments. Two of these adjustments provide the vertical and lateral movement required to bring the work into the proper position in the field of the optical system. The third adjustment, which is in line with the optical system, focuses the image on the screen. A pair of Vee blocks with adjustable centers is supplied with each instrument, permitting work to be held in the work carrier by either means. Special brackets for supporting gears and clamping blocks for special fixtures may also be attached to the carrier upon occasion.

For ordinary purposes, light is supplied by a special concentrated, single filament, 6-volt, 108-watt Mazda lamp, taking the current through a transformer from the usual alternating current lamp socket. For extremely critical work, the Tungsarc lamp, the light source of which is a ball of tungsten, is recommended. For the projection of gear contours at high magnifications on a wall screen or the inspection of helical gears by reflected light, the greater intensity of the arc lamp is advantageous. With the arc lamp, difficulty is sometimes experienced in obtaining clear outlines owing to fluctuation of the light source.

Special corrections have been made in the optical system to suit it to the work for which the instrument is intended. Referring to Figs. 2 and 3, A is the source of light, and B an aspheric lens serving as a condenser, which is supplemented by the lens C. These condensers are mounted in a cone to insure constant optical alignment. Lens B is contained in a focusing mount permitting adjustment to image the light source in the focal point of lens C, so that a concentrated beam of parallel rays of

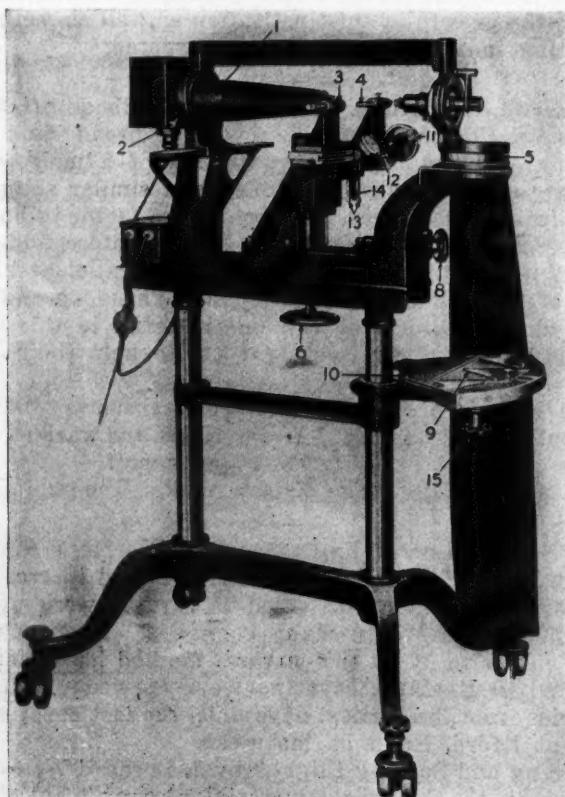


Fig. 1—Contour measuring projector equipped with adjustable thread chart and lead-measuring attachment

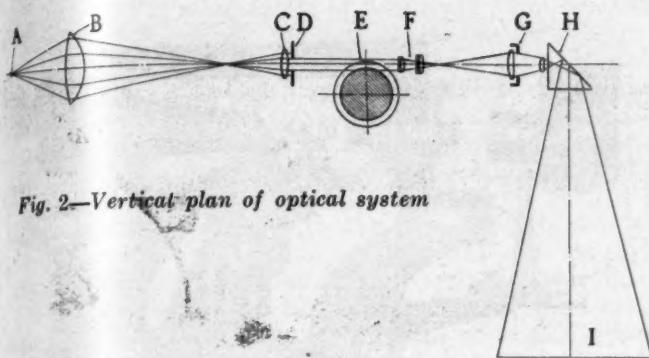


Fig. 2.—Vertical plan of optical system

light projects from the latter. An iris diaphragm *D* permits adjustment of the diameter of the beam as required. The rays pass across the object *E* into the objective lens *F* of a compound microscope. Beyond the eyepiece *G* is a right-angle prism *H* which reflects the light downward to the table, forming the enlarged image *I*.

Operating Mechanism

For projection of images upon a wall screen, the prism *H* may be swung out of the line of the remainder of the optical system. This arrangement is necessary to secure high magnification when using low power lenses for the projection of gear tooth contours. Under this condition, the work must be carried on in a dark room and the screen must be set at right angles to the line of projection. Regular equipment consists of a 24 mm. special objective in a long tapering mount of small diameter for work over the top of large diameter gages or threads and a 48 mm. objective for smaller magnification or a larger field. Eye-pieces of 5 and 12 power are furnished to allow a wide range of magnification.

The projection principle of this apparatus when used as a thread projector differs from that of other thread projectors in that the entire optical system is at all times lined up on a single, central axis. The light sources, the condenser, the portion of the screw to be projected and the objective are always part of a single co-axial system and the screen receiving the image is always perpendicular to this axis. This method does not produce an image which is geometrically similar to the thread contour in the plane of the screw axis, but one similar to that in a plane making an angle with the axis equal to the mean helix angle. The desired flank angle differs from the angle of the projected contour, but the two angles bear a definite

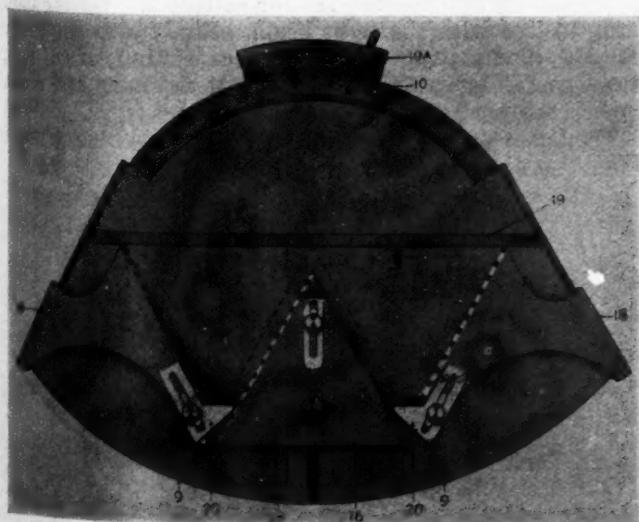


Fig. 4—Adjustable thread chart for thread comparison

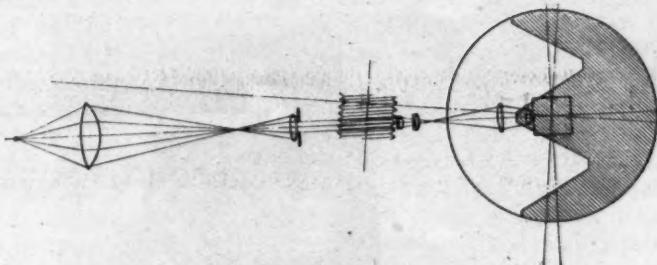


Fig. 3—Horizontal plan of optical system as set up for thread projection

mathematical relation. For most threads the difference between the two angles is so small that for all but the most precise work they may be considered equal. Exact conversion may be obtained by the following formula: Let A be one-half the desired angle in the plane of the screw axis.

R = one-half the projected contour angle

B = one-half the projected
 H = the mean helix angle

Then

$$\tan A = (\sec H \tan B) \text{ or } (\tan B / \cos H) \quad \dots \dots \dots \quad (2)$$

For 60 deg. threads ($A = 30$ deg.) equation (1) becomes

For 60 deg. threads, when H is 5 deg., the difference between the flank angle as defined and the projected contour angle is 12 min.; when H is $2\frac{1}{2}$ deg., the difference is 2.2-3 min. It is obvious that the difference may be neglected for the most exacting commercial work when H is $2\frac{1}{2}$ deg. or less. Results will be satisfactorily accurate for a great share of commercial work when the difference is neglected for threads having a helix angle as great as 5 deg.

Advantages Claimed

Several advantages are claimed for this system in which the beam is projected in line with the mean helix angle. They are defined by the maker as:

1. The definition will be of the highest quality.
 2. The image contour will be geometrically similar to the contour in the plane projected. This contour differs from that in the plane of the axis by a definite, known amount and correction may be easily made. In other words, the operator deals with definite known quantities.
 3. The angular aperture of the objective does not limit the usefulness of the instrument.

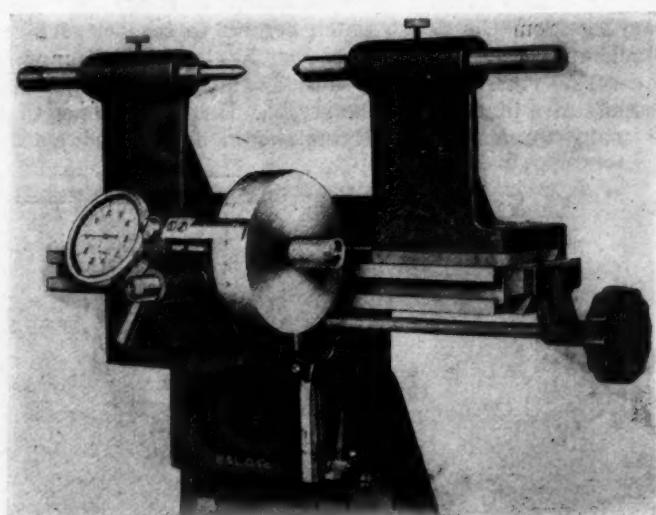


Fig. 5—Lead measuring attachment for production work

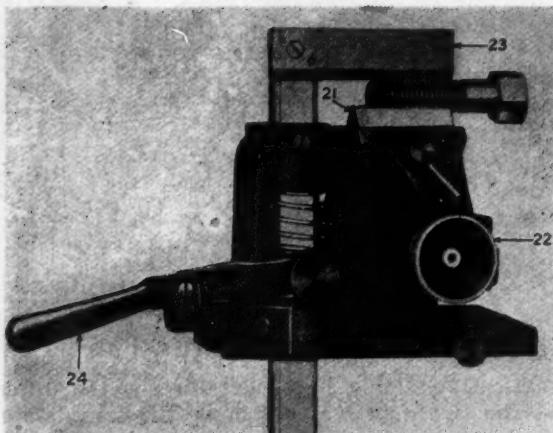
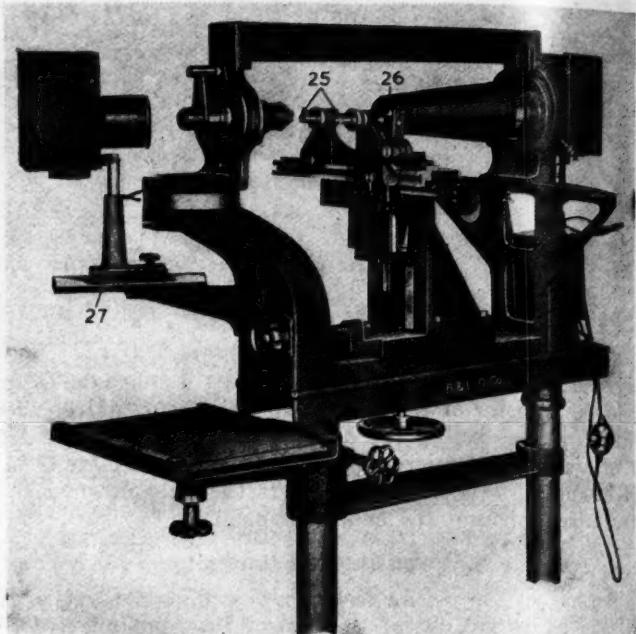


Fig. 6—Universal screw holder which supports screw on standard pitch blades

Fig. 7—Gear testing attachment and illuminator in place



4. The whole system is mounted as a single unit and may be rotated about an axis provided with a scale so that it can be accurately set to the mean helix angle. This eliminates the loss of time in searching for the correct angle of illumination.

Several attachments have been developed for special uses. These include an adjustable thread chart, Fig. 4, which has a graduated arc and vernier for checking the lean of threads. The use of paper charts for different threads and magnifications is eliminated, as by means of scales the adjustable straight edges of the chart may be set for any pitch and flat at the root of the thread. The adjustable chart can be readily interchanged with the holder for the plain screen and photographic plate holder.

By means of the lead-measuring attachment, illustrated in Fig. 5, it is possible to check errors in lead to 0.0001 in. This attachment consists of a bracket clamping in a T-slot on the front of the cross slide of the work carrier. This bracket carries a dial gage indicating the zero point. Readings of lead or movement of the slide are made by means of a micrometer which is graduated to 0.0001 in.

For the rapid inspection of screws, a universal screw holder, as illustrated in Fig. 6, is substituted for the centers. This holder accommodates a range of work varying from the finest watch screws to screws of 2 in. diameter. This device is noteworthy in that it supports the screw entirely by the thread walls which constitute the effective diameter of the screw. Held in this position, as many threads of the screw should be gripped by the

pitch blades as will ultimately be in engagement with the tapped hole. The resultant effect of lead and diameter errors is readily discernible on the comparison chart. This method of inspection, which has been adopted after exhaustive experiments, takes into account and makes allowance for the difficulty involved in the production of screw threads on the usual commercial equipment. By combining the unavoidable errors of lead and diameter, an instant check is made of the possibility of assembly in a standard tapped hole.

Special adjustable brackets (25 in Fig. 7) having $\frac{1}{2}$ in. diameter studs are provided for supporting gears. An indexing attachment, 26, permits quick observation of index errors over any number of teeth. By rotating the gears at a uniform rate, the rolling and sliding action of the teeth may be observed to good advantage and any imperfections easily noted. For spur gears, the light may be projected along the teeth, but for spiral gears it is necessary to illuminate the work by oblique or normal illumination directed against the surface of the work. As an alternative, thin blanks may be cut from 22 gage metal and the regular method of examination used. The rolling action of these blanks may be studied with the aid of special mounting brackets for setting the helical tooth flank in line with the light beam. Fig. 7 also shows the oblique illuminating attachment consisting of a lamp house containing a 6-volt, 108-watt Mazda lamp and a condenser mounted upon an adjustable base.

The latter arrangement can be used only with low power

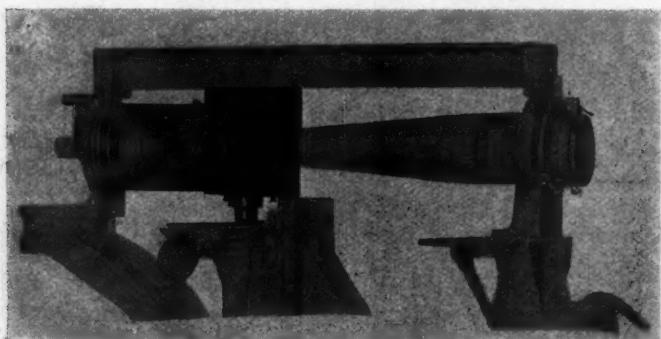


Fig. 8—Vertical illuminator used in examination of small parts

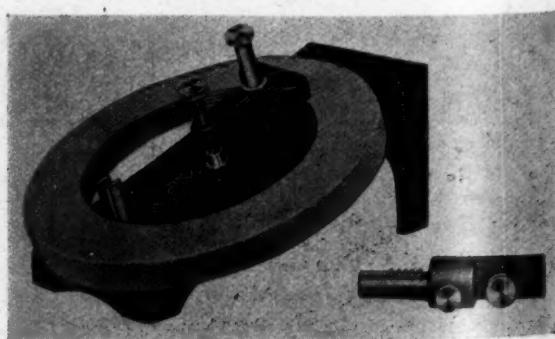


Fig. 9—Sulphur cast attachment for examination of thread sections of large diameter rings

objectives. For examination of very small parts requiring high power objectives, the attachment shown in Fig. 8 may be used. This device, which is known as a vertical illuminator, is attached to the nosepiece of the optical tube and provides illumination normal to the surface under examination. A lamp house with a special condenser is mounted upon a bracket which may be readily attached to the instrument. Owing to the loss of light incident to illuminated set-ups such as the two arrangements described, it may be necessary to substitute at the light source a 5-ampere arc lamp for the 6-volt Mazda lamp.

V-blocks and special angle plates with clamping blocks are provided for the retention of parts of unusual shape. A special sulphur cast attachment has been devised for the examination of large diameter rings. The latter device, intended for use with the standard V-blocks, is illustrated in Fig. 9. Several holes are drilled in the face of the angle plate to permit shifting of the clamp for the

accommodation of a range of diameters. A cast composed of 94 per cent sulphur and 6 per cent graphite can be poured while the ring is fastened to the angle plate. The ring is then loosened by light tapping and the cast with its support transferred to the projector, where it is correctly positioned in the V-block by a key. Previous to this development, difficulty was experienced in the determination of the true helix angle of a cast. As this phase of the work is now accomplished automatically, a much higher degree of accuracy is obtained with a considerable economy in time.

It is not intended here to go into the details of operation and setting of this instrument, which is in use for a variety of inspection and investigation work in several automotive plants. Because of its self-contained and portable character the instrument can be used with equal facility for both laboratory work and inspection of commercial products.

Wheelbase Lengthened on New Case Model

Overslung spring suspension replaces underslung type. Weight of phaeton increased only 60 lbs. despite greater car length.

A NEW chassis, known as Model Y, replaces the former Case Model W. The new chassis is 3 in. longer in wheelbase, being 132 in., as compared with 129 in., and contains a number of mechanical alterations. The changes have been for the purpose of increasing the comfort and the life of the car. The rear spring bolts, for instance, are now $\frac{5}{8}$ in. and 1 in. in place of $\frac{3}{4}$ in. and $\frac{7}{8}$ in. The adjustment for wear, which was formerly only on the rear of the springs, is now utilized at both ends of all the springs.

The former suspension was overslung instead of being underslung as in the Model W. In spite of this change the car has not been raised, because the springs are flatter under load and are mounted outside the frame with a 5-in. drop at the rear shackles. Despite the 3-in. increase in wheelbase the increase in weight of the open model, ready for touring, is only 60 lb., the present weight being 3750 lb., as compared with 3690 lb. for the former model.

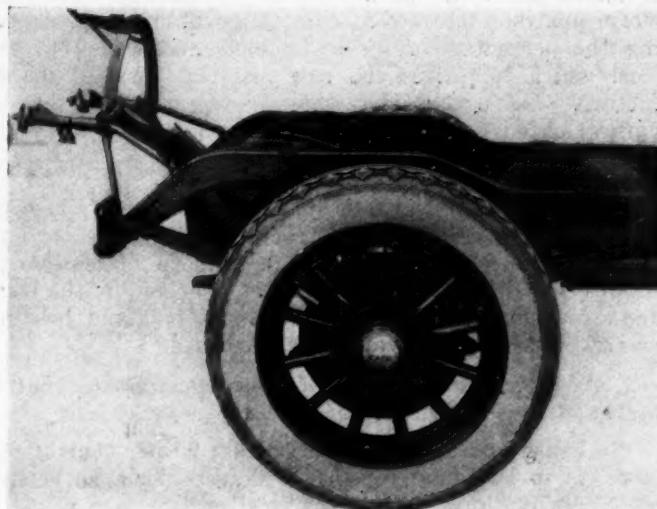
No Engine Changes

No changes have been made in the engine, this remaining the Model 6-T Continental. This is a six-cylinder, $3\frac{1}{2}$ by $5\frac{1}{4}$ -in. unit, with a four-bearing, $2\frac{3}{8}$ -in. crankshaft and silent chain front-end drive. The carburetor is a $1\frac{1}{2}$ -in. water-jacketed Rayfield and the electrical equipment for starting, lighting and ignition is Delco, with a third brush regulated generator. The storage battery is a Willard, rubber thread, 135 amp.-hr.

No change has been made in the clutch, which is of Case manufacture. This is an $8\frac{1}{2}$ -in. multiple plate type, the same as used in previous Case models.

The universal joint equipment is the Snead, rubber and fabric disk, with a tubular steel propeller shaft. The rear axle is a Columbia $\frac{3}{4}$ floating unit, as previously. This is mounted on tapered roller bearings throughout, with $1\frac{7}{16}$ in. diameter nickel steel driveshaft with 10 spline fittings. The standard gear ratio is 4.7 to 1 for all closed models. The drive is taken through the rear springs, but the torque is taken by a tubular torque arm.

The frame has been strengthened to a considerable degree to increase its rigidity and to support the longer body. The frame on the former Model W was 6 in.



New spring suspension on Case 1924 model

by 2 in. by $5/32$ in. and on the present Y model is $6\frac{1}{8}$ in. by $2\frac{1}{2}$ in. by $3/16$ in. Four cross-members are used on the frame as formerly, but in addition there are two frame cross tubes, one at the front and one at the rear, and two lateral gussets located at the main center cross-member, whereas formerly there was none. The tire size is now 33 by 5 in. in place of 34 by $4\frac{1}{2}$ in., and the tire rack supports two rims in place of one rim as formerly.

Body Features

On the seven-passenger model the rear seat is $3\frac{1}{2}$ in. wider than the W, and the auxiliary seat larger and more comfortable. Window regulators are now fitted on both the doors and rear windows instead of the doors only. The equipment consists of a Warner 75-mile speedometer, Boyce motometer, Kellogg power tire pump, Klaxon horn, and the usual full lamp, dash and tool equipment. The chassis is lubricated by the Saal oiling system applied at 32 points. The Case Model Y sedan fitted on this chassis sells at \$3,325 f.o.b. Racine. Other prices will be announced later.

Research Finds Answers to Questions About Ball Bearing Quality

Metallurgist claims inner race is part most susceptible to failure. Impossible to procure steel which is entirely free from defects. Approves cold forming and forging process. Says strains set up during manufacture are relieved by annealing.

By H. G. Freeland
Metallurgist, Hoover Steel Ball Co.

QUESTIONS arise from time to time in the minds of bearing manufacturers and users of balls regarding the quality of the balls put on the market by different makers. This is often prompted by statements which they hear, some of which may be inaccurate or confusing, and possibly by the fact that different modes of manufacture are used by different makers. Furthermore, analyses indicate a wide range of opinion regarding the percentage of essential elements needed in the steel which comprises the raw material for ball manufacture. Let us consider some of the questions in the natural order in which they may arise.

1. Which is most liable to fail, the races or the balls?

Endurance tests indicate that the cause of failure of bearings is more often to be found in the races than in the balls, and that the inner race is more susceptible to failure than the outer. This has been verified by the tests and experience of some of the largest ball and bearing manufacturers in this country and abroad.

2. When balls are to blame for bearing failure, what is the usual cause?

The cause of ball failure, in at least 90 per cent of the cases, is to be found in surface defects, such as seams, most of which originate in the steel mills.

3. How do balls usually fail?

When balls cause bearing failure, the initial ball failure is usually a flaking or spalling off of the surface. Very seldom do high quality balls actually break, initially.

4. Knowing the origin of most of the defects, is it not possible to procure steel entirely free from same?

The answer to this question is "No." There are no steel mills which can supply, as yet, on a commercial basis, drawn wire, rod, or hot rolled stock entirely free from such defects as rolling laps, seams, decarbonization, etc. Therefore, the only thing to be done is to purchase the raw material from the most reliable steel companies, and then not to release it for production unless it meets the most rigid requirements possible of fulfillment.

One hundred per cent inspection is not possible in a commercial way, as this will require a pickling and examination of all the surface of the wire, rod, and bar stock consumed. Even then, you may have porosity and slag inclusions just concealed below the surface, any of which may be the starting place for failure through fatigue.

5. Is there any material difference in the quality of balls which have been made by the process of cold forming or forging and those made by turning?

It will be seen from the answers to the above queries that it is not so much a question of the particular process of manufacture as it is of procuring steel which is uniformly free from defects, particularly those on or near the surface. The writer believes that it is the commonly accepted opinion among engineers that mechanical forming is beneficial rather than injurious to steel, particularly when the strains set up through deformation have been properly relieved by the correct type of heat treatment. The additional working a forged ball receives improves it, for the same reason that rolled or hammered stock is better to make tools from than the original ingot from which they came.

The machining of turned balls produces strains which are serious, particularly in the neighborhood of the surface, and which should be eliminated by correct heat treatment. That correct annealing will relieve the strains produced by mechanical deformation is illustrated by the fact that unless wire which is being cold drawn is given a sufficient anneal between different stages of reduction it is not possible to reduce the wire to the required size by this method.

The mechanical deformation that cold-pressed and forged balls undergo in their formation produces results similar to those attained in the mill by the cold drawing of rod and wire and the hot working of the ingot down into the billet and finally into the form of hot rolled and hammered stock. This worked material, when correctly heat treated, is acknowledged to be superior to castings and, therefore, superior in quality to the ingot from which it is made. This cold drawn rod and hot rolled stock constitute the raw material from which turned balls as well as those formed by other processes are produced.

A defect, such as a seam, which has not been entirely removed from the surface of the ball at the equator, is just as serious, if not more so, in the case of the turned ball, owing to the fact that the end grain of the ball is weaker than the cross section. Therefore, when pressure is applied under the right conditions metal is liable to break away from the defective area on the turned ball, while under the same conditions the pressure will be applied more nearly at right angles to the end grain in the case of the pressed or forged ball. This means that, under the conditions cited, a pressed or forged ball will be more resistant to flaking.

The above statements indicate that, besides the fact that pressed and forged balls can be produced at a price which is satisfactory to the trade, they are really superior to turned balls, on account of the mechanical working which they receive during production.

The writer in the fall of 1922 had the privilege of visit-

ing ball companies in England and Sweden, and at that time learned that the major portion of their production consisted of balls which had been formed by cold pressing and hot forging. This is in accordance with our practice here in America.

6. Are the strains set up in balls during manufacture completely relieved before the balls are shipped to the consumer?

The strains set up by the deformation of the metal during forming usually are relieved by a subsequent annealing operation. Later the balls are hardened, and it is the effect of quenching the heated steel which again produces a strained condition. Steel, when annealed, is in its normal state. If it is quenched from a point above, or within its critical range, it retains at ordinary temperatures a state which is only normal to the steel at a high temperature. The effect of the quench becomes less as the center of the ball is approached.

This difference in hardness between outside and center is accompanied by a difference in micro-structure, both differences increasing with the size of the ball, all of which means non-uniformity, with its attendant internal strains. This condition will not be completely removed until the steel has been heated high enough to cause its return to the annealed state. In other words, if the balls were entirely relieved of the strains caused by hardening, they would be of no use to the bearing manufacturer or his customer.

A compromise is therefore made by heating the balls in oil at a temperature that will relieve as much of this non-uniformity as possible and at the same time leave the balls sufficiently hard, in order that they may preserve their necessary resistance to deformation under load and not wear appreciably in service.

7. What effect has end grain on resistance to wear?

Balls have been measured after running millions of revolutions at excessive speed and under great overload, and it was found that, if free from dirt and correctly lubricated, no reduction of size had taken place. The instrument used for determining the size was capable of measuring a difference of one forty-thousandth of an inch on the diameter. This would mean that if anything was removed from the surface the amount was less than one eighty-thousandth of an inch.

Inquiry has been made of several noted authorities on ball and bearing matters and they state that in their experience, when ball bearings were properly oiled and housed, the wear is negligible. It will be seen from this that the factor of wear is of little consequence when considering the probable sources of ball failures. As an answer to Question No. 7, consider the following:

If there was any difference in resistance to wear between the end grain and side grain of steel balls, the manufacturers could not reduce or finish the balls in tumbling barrels, because they would become out of round. This operation of tumbling may be considered as an accelerated abrasion or wearing test, and as a matter of fact, balls which are put into barrels for reduction, and which possess a spherical accuracy of one-twenty-thousandths of an inch, for instance, will be reduced in size after tumbling with abrasive but will retain their original spherical accuracy.

8. What use has chromium in steel balls?

Large steel balls usually contain more chromium than those which are smaller, for the reason that by adding extra chromium the hardening or penetrating effect of the quench will be increased in the larger sizes of balls, while at the same time the embrittling effect will be less

than if the carbon was increased a sufficient amount to produce the results desired. In addition to this, as the mass increases it is necessary to add chromium in order to eliminate the tendency to soft spots on the surfaces of the spheres. Steel possessing the correct amount of chromium is not as sensitive to small variations in heat treatment as plain carbon stock. It is, therefore, easier to obtain consistently uniform properties. It will be seen from this that it is essential to consider the mass of metal and the purpose of its use in each case. Excessive chromium is not beneficial, as it tends to reduce the toughness, and as toughness aids in resisting fatigue under vibratory stresses it will be seen that it is very essential that care be exercised in its use. This explains why small balls require less of this element than large ones; also, why small balls usually contain less chromium than the rings between which they run.

9. Does the deep etching test described by the Bureau of Standards indicate that cold pressed and hot forged balls are inferior to those which are turned, when considered from the standpoint of ball life under service conditions?

Technologic Paper No. 156, "Metallographic Features Revealed by the Deep Etching of Steel," page 13, states: "Only the severely hardened specimens showed any tendency to split upon deep etching." This refers to $\frac{1}{2}$ -in. and $\frac{3}{8}$ -in. balls which were either forged or pressed, while the 1-in. forged balls did not show the tendency to split. Further along on the same page we find the following statement: "It will be noted in Table 2 that the balls of $\frac{1}{2}$ in. diameter are of a steel containing no alloying element and of a carbon content considerably lower than that of either of the other two. In order to render this steel relatively as hard as the other two types, a much more severe treatment must be resorted to, and this fact probably accounts largely for the greater tendency of this series to split than the other two."

It should be noted here that this statement agrees with the thoughts expressed in the answer concerning the use of chromium in Question No. 8. It is also interesting to note the following statements which occur on page 24 under "Summary and Conclusions": "Steel which is not mechanically uniform throughout because of the presence of initial stresses, which may be the result of previous mechanical work or of too vigorous quenching during heat treatment, will split when deeply etched, provided the stresses are of sufficient magnitude. Commercial bearing balls of different types were used to illustrate this feature. It was shown that this tendency to crack upon etching may be eliminated by suitable heat treatment."

The above statements indicate that the small sizes of balls require the correct amount of chromium, so that a severe form of heat treatment will not be required, thereby reducing the stresses resulting from too vigorous quenching methods. That only the severely hardened specimens split is acknowledged in the statements above, while the fact that the tendency to crack upon deep etching may be eliminated by suitable heat treatment is stated in the Summary. This covers the relieving of strains, whether from previous mechanical work or from too vigorous quenching during heat treatment.

It will be remembered that it was shown in the answer to Question No. 6, regarding strains set up in balls during hardening, that all the strains are never entirely removed, so it is also possible that the strains which have been brought more or less to a state of equilibrium by means of a draw subsequent to the hardening operation have been returned to a more unbalanced condition by the effect of the differential etching which occurs at the time of, and on removal of, the surface metal during etching.

Front-Wheel Brake Design Involves Two Major Problems

Part III

Application must not interfere with steering and additional stresses on front axle and springs must be taken care of. These questions have been recognized for many years. Inter-action of brakes and steering gear needs more study.

By P. M. Heldt

At the present time there is no longer any doubt that the front wheel brake will play an important part in American automobile engineering the coming year. Having been adopted as standard equipment by leaders in two or three price classes, public curiosity in it will be awakened and general confidence in such brakes as useful components of motor cars will be strengthened.

The argument has been put forward that up to now the rear wheel brakes on many American cars have been faulty in various respects, and the suggestion has been made that it would be far better to improve the brakes already on the car than to complicate the mechanism by adding another set. A similar argument was made against the multi-cylinder engine some twenty years ago, but it will be remembered that in that case the advocates of multi-cylinder construction won out. The number of cylinders on the more expensive cars on the market increased from two to four, then to six and eight, and finally to twelve.

If four wheel brakes are justified at all, they naturally should go on the larger and more powerful cars, because of the higher speeds of which these are capable and because of the greater difficulty of providing adequate braking surface with two wheel brakes on the larger cars, owing to the fact that the wheel diameters are almost the same for all cars. The writer does not believe that there has been any appreciable demand for four wheel brakes from the American buying public so far, and those manufacturers who have adopted them have done so on their own initiative. However, as a result of the publicity which these brakes are receiving through their adoption by leading manufacturers, we may expect the public to ask for them in the future, and the demand undoubtedly will be most urgent in the more expensive classes.

Addition of Two Brakes

The adoption of four wheel brakes means essentially the addition of front wheel brakes to rear wheel brakes, which latter are now in universal use. Therefore, the engineering problems which have to be solved when adopting four wheel braking are those connected with front wheel brakes. Front wheel brakes are by no means a new idea or of recent origin. We need not refer here to the use of such brakes on the front wheels of early electric cabs and other vehicles which steered through the rear wheels, as the chief problems arise through the combination of the steering and braking functions in one pair of wheels. However, there is an American patent on brakes applied to forward steering wheels dating as far back as 1907 and in 1909 and 1910 there was a great

deal of discussion in the British automobile press on the subject. In a review of the Olympia (London) automobile show held here during the latter part of 1911 we find the following:

"One of the most notable absentees from Olympia was the front wheel brake, only one car being so fitted in the entire show, one is forced to the opinion that the apparent failure of front wheel braking is not due to the brake or the principle, but rather to the arrangement adopted by various firms for actuating the brake shoes. * * * Too many designers seem to have fitted this type of brake as an afterthought and without embodying it as a feature of the design, and, consequently, numerous difficulties arose in connection with the suspension of the rods which would not have arisen had the problem been treated really seriously."

A 15-Year History

It will thus be seen that the history of front wheel brake development extends back for about fifteen years and that many of the earlier applications proved a failure for one reason or another.

There are two general problems to be solved in connection with the application of brakes to the steering wheels. In the first place, the application of these brakes must not interfere seriously with the steering wheel; that is, it must neither greatly increase the effort required to operate the steering wheel under any condition, nor must it render the steering operation ineffective; secondly, the additional stresses imposed on the front axle and springs by the application of the brakes must be properly taken care of. The latter problem merely calls for an increase in the strength of the front axle and a somewhat better support against torsional forces, and does not involve any particular difficulties. It will be well, however, to investigate the problems relating to the prevention of interference of braking with the steering function.

In the ordinary car the front wheels when deflected for steering describe an arc of a circle around the axis of the knuckle pivot. The motion of the wheel on the ground when thus deflected is partly a sliding but chiefly a rolling motion. If the wheels on such a car were locked by brakes, it would be much harder to deflect them. That a great effort is required to turn the steering gear of a car while at rest is well known, and in that case there is nothing to hold the wheels from rotating. With the wheels fully locked it would probably be entirely impossible to deflect them by means of the ordinary steering gear. To overcome this difficulty, cars with front wheel brakes are always designed for center point steering;

that is, the knuckle pivot is inclined at such an angle in the transverse plane that its axis produced strikes the ground at the center of the contact area between tire and ground. Deflection of the wheels then produces no rolling motion, and the resistance to deflection is the same whether the wheels are locked or free.

Center Point Steering

There is another reason for the use of center point steering in connection with front wheel brakes, and that is that unequal retarding effects must not deflect the front wheels from their course. Even with equalization of the force of application, the braking effects on the two wheels will be greatly different if one of them happens to be on slippery ground while the other has a firm footing, whereas if no brake equalizer is used inaccurate adjustment of the two brakes will cause inequality of their braking effects. Further, with front wheel brakes it is often endeavored to render the braking effect of the outside wheel nil when turning a corner. With the ordinary arrangement of the steering pivots, where the ground resistance acts through a lever arm around the steering pivot axis, such inequality of the braking effects on the two wheels would tend to deflect the front wheels from their course and subject the steering linkage to additional strains.

To prevent loss of steering control it must be impossible to lock both front wheels while they are deflected from the straight ahead position. The steering function is based upon the principle that a rolling wheel progresses in the plane of rotation, so that by changing this plane by means of the steering gear the direction of motion of the front end of the car can be changed. If the front wheels are held from rotation they no longer obey this law but follow a path depending upon the direction of the propelling force on the one hand, and the resistance to sliding motion in different directions on the other. The propelling force is parallel to the axis of the car, and the resistance to sliding motion of the front wheels usually is equal in all directions. If these conditions obtain, the front wheels will keep moving in a line parallel with the axis of the car, no matter how much they may be deflected from the "straight-ahead" position. In other words, a front wheel skid will be produced. This, of course, is a very dangerous thing, and provisions must therefore be made to prevent the locking of both front wheels whenever they are deflected from the straight ahead position. The locking of one wheel is not particularly dangerous, because one rolling wheel has sufficient directing tendency to assure safe steering. However, the free wheel should be the outer one, because that turns so much faster and has a correspondingly greater directing power, and also because greater resistance on the inner and less on the outer wheel tend to help the steering.

This requirement can be met by using a universal joint of the cross type in the brake-camshaft and leaving the two front brakes unequalized. As is well known, such a joint has the property that it converts the uniform angular motion of the driving shaft into periodic variable motion of the driven shaft if the two shafts make an angle with each other. For 90 deg. of angular motion

the driving shaft turns faster than the driving shaft, and for the next 90 deg. it turns slower. The differences in the speeds of the driving and driven shafts increase with the angle between them. When the axis of the driving shaft yoke is in the plane of the two shafts the driven shaft turns at its maximum speed, and when the axis of the driven yoke is in this plane, the driven shaft turns at minimum speed. Midway between these two angular positions the driving and driven shafts turn at the same speed.

It follows from the above that if we had two short shafts connected by such a universal joint, and secured to each shaft a pointer moving over a dial graduated in degrees, if the two shafts made an angle with each other a motion of one of the pointers through a certain number of degrees would be accompanied by a different angular motion of the other pointer. In such an experiment the best angular position to start from (the zero point) would be that for which the driven shaft turns at the same velocity as the driving shaft, that is, slightly more than 45 deg. ahead or behind the position where the driving shaft yoke axis is perpendicular to the plane of the two shafts. Then, if the driving shaft is turned, say, 20 deg. beyond this point, the driven shaft will be turned through a larger angle whose exact value will depend upon the angle between the two shafts. For a certain value A of the angle between shafts the driven shaft would turn through an angle of, say, 21 deg. and for a certain larger angle B the driven shaft would turn through an angle of 22 deg. Now let us suppose that while the shafts make an angle AC with each other the driving shaft is turned through an angle of 20 deg., which entails 21 deg. rotation of the driven shaft. If now the angle between the shafts is increased to B

while the driving shaft is held against angular motion, the driven shaft must describe an angular motion of 1 deg. around its axis so that the total angular motion from its zero position is 22 deg., the same that it would have described if the angle between the two shafts had been B in the first place and the driving shaft had been turned through an angle of 20 deg. It is thus seen that a change in the angle between two shafts connected by a universal joint entails an angular motion of the driven shaft around its axis if the driving shaft is held against angular motion. Now let us see how this can be applied to the problem in question.

An Illustrative Case

Let us assume that there are universal joints in the shafts operating the brake cams or toggles of the front wheel brakes and that when the wheels are in the straight ahead position the pin through the driving shaft yoke makes an angle of 45 deg. with the horizontal when the brake is "full on." This is the angular position of the joint for which the speeds of the two shafts are substantially equal. Now let the front wheels be deflected for steering. This deflection will also be imparted to the brake cams and their shafts, and the effect will be to turn the cam so as to apply the brakes more tightly. We have assumed, however, that the brake is already fully on, and in that case the effect will be to back up the operator's foot correspondingly. The important point is that in steering the two front wheels always deflect unevenly, the

inner wheel describing a materially greater angle than the outer one. Hence, the camshaft on the inner wheel will be deflected the most, and it is the deflection of this cam that determines the amount of backing up of the brake pedal and also of the camshaft on the other wheel. Therefore, whereas the cam of the brake on the inner side will remain in such a position that the brake on that side will remain on tight, the cam on the outer side will actually loosen the brake, hence that brake cannot possibly be locked.

The principle of the cross type of universal joint is widely used for the actuation of front wheel brakes. It permits of the application of the brakes to any degree when the wheels are in the "straight-ahead" position and at the same time prevents locking the outside wheel when turning. Undoubtedly other combinations of mechanism can be worked out that will give the same effect. The problem can partly be solved by dividing the force of application unequally between the front and rear brakes, as by using a compensating lever with arms of unequal length. The leverage of the brake linkage might then be made such that the driver could barely lock the rear wheels but could not possibly lock the front wheels. Again, the mechanical advantage or leverage of the front wheel brakes might be reduced in other ways, as compared with the rear wheel brakes.

Skidding Is Obviated

One advantage claimed for four wheel brakes is that they obviate skidding. The addition of front wheel brakes to the usual equipment of a car undoubtedly lessens the tendency to skid, but it can hardly be maintained that it makes skidding entirely impossible. Rear wheel brakes when applied with such force as to lock the wheels have a tendency to cause skidding, and on greasy road surface it requires only a mild application of the brakes to lock the wheels. If front wheel brakes were used alone the ordinary rear wheel skid would be impossible, because the rear wheels would then continue to rotate as long as the car was in motion, and thus would retain their directing power. Front wheel brakes, however, may cause a front wheel skid, if through misadjustment or for other reasons it is possible to lock both front wheels. The use of front wheel brakes eliminates rear wheel skids only in so far as with brakes on all four wheels the physical effort of the driver in applying the brakes is divided between the front and rear brakes and he is therefore much less likely to exert sufficient effort to lock the rear brakes, as that would require substantially twice the effort as with rear brakes only. On the other hand, the use of so much braking force that there is danger of locking the rear wheels, is called for much less frequently, because with four wheel brakes that results in substantially twice the retardation, or in halving the stopping distance, as compared with brakes on the rear wheels only. Thus, while the danger of skidding is not entirely eliminated it is at least greatly reduced by the use of brakes on all four wheels.

Possibility of Rattle

One of the points which has been raised in connection with the adoption of front wheel brakes is the possibility of rattle and squeak in these brakes. Much emphasis has been laid on absolutely silent operation in recent years, especially silent at the forward end of the car, and the public certainly would not take kindly to a front braking system that after a year's operation, say, showed considerable looseness in its joints and in consequence rattled unpleasantly. This is a point which designers have to look out for. All of the connections in the brake linkage should be well fitted and provided with adequate bearing

surfaces, and in addition it is well to make any provision for taking up all slack in the linkage by a suitable tension spring. Squeaking of the brakes is a matter that the designer cannot well guard against. It is very annoying to most drivers of present cars, and conceivably will be even more annoying if it occurs in the front of the car. It is generally ascribed to glazing of the linings, and since with four wheel braking the work of the individual brake is materially reduced, the lining should not glaze so readily. Moreover, there is a number of remedies for squeaking brakes, such as roughening the surface of the lining by means of abrasives.

Sudden Stopping Signals

The question has also been asked—What will happen on some of our suburban roads on Sundays and holidays, when the cars on them usually run in very close formation, if a stopping signal is suddenly given and some of the cars in the procession are capable of reducing their speed twice as fast as others? There is, of course, always a certain danger involved in running very closely behind another car, but it is not likely that this danger will be increased by the use of four wheel brakes, for every driver in a procession naturally tries to maintain a constant amount of headway and will apply his brakes accordingly. The ability to stop very quickly no doubt will add somewhat to the chances of being run into from behind, but it will at least correspondingly reduce the chances of running into the car ahead.

When brakes are fitted on all four wheels, it is, of course, desirable to operate all of them simultaneously by the pedal, because of the reduction in the strain on the brake lining and the tires, as well as for the reason that much greater maximum braking effect can be obtained that way from brake application by the foot only. But what is to be done with regard to the emergency brake?

Emergency Brakes

Must a separate brake or set of brakes be fitted for emergency use or will a separate operating linkage for the rear wheels suffice? With the present arrangement we have two distinct braking systems and any derangement or breakage of any part of one system will not interfere with the operation of the other system, except where rear wheel brakes only are used the drums are generally common to both brakes. This has a distinct advantage from the standpoint of safety. It appears that many of the foreign cars employing brakes on the front wheels have only the four brakes which are operated simultaneously. The French law calls for two distinct braking systems, but apparently one brake on each of the four road wheels of which all four can be operated by the pedal and all four or the rear ones only by the lever, are accepted as meeting this requirement. In some of the French systems nothing seems to be duplicated except the operating device, the whole of the linkage being common to both the hand and the foot brake.

A scheme devised to solve the problem of providing two independent braking systems without undue complication was that known as diagonal braking. It consisted in applying one front and one rear brake, the two on opposite sides of the car, by pedal, and the remaining two brakes by hand lever. This diagonal braking system is covered by patents of the French engineer Perrot and at one time was the subject of much discussion, but the fact that none of the present licensees under the Perrot four wheel brake patents are using this plan is good evidence that it has no practical advantages. It sacrifices one of the strong points of the four wheel braking system, that distribution of the braking effort between four brakes greatly reduces

the strain on the brake lining and on the tires, as all of the service braking is done with two brakes, the same as in the ordinary system. Besides, the greater stopping power of four wheel brakes is available only if both the hand and the foot brake are applied at the same time, and in an emergency this cannot always be done as quickly as applying the foot brake only.

Another feature that has been widely discussed in connection with four wheel braking is the successive application of rear and front brakes, or vice versa. This can be done, for instance, by applying the force of application

to the rear brakes through a coiled spring and leaving so much slack in the linkage to the front brakes that these springs must be compressed before the front brakes are applied. It requires little argument, however, to prove that, both as regards bringing the car to a stop in a minimum distance and distributing the necessary work most nearly uniformly over the total surface available, all of the brakes should be applied simultaneously. This most desirable effect is obtainable with the simplest linkage, assuring the greatest freedom from rattles and the least danger of breakage.

Automatic Adjuster Reduces Valve Clearance to Minimum

Four main working parts in new device which, it is claimed, does away with hand adjustment. Takes up slack in linkage.

AN automatic valve adjuster which is claimed to do away with hand adjustment, reduce valve clearance to a minimum and provide a direct acting means for keeping a constant clearance in the valve mechanism, has recently been developed.

The A-V-A, as the device is called, has four main working parts; a cylinder closed at one end, a piston, a spring and a check valve. The inner surface of the cylinder is ground accurately to accommodate the piston. In the center of the piston is a check valve opening downward. A spring tends to urge the piston toward the open end of the cylinder. The chamber above and below the piston is filled with oil of medium viscosity.

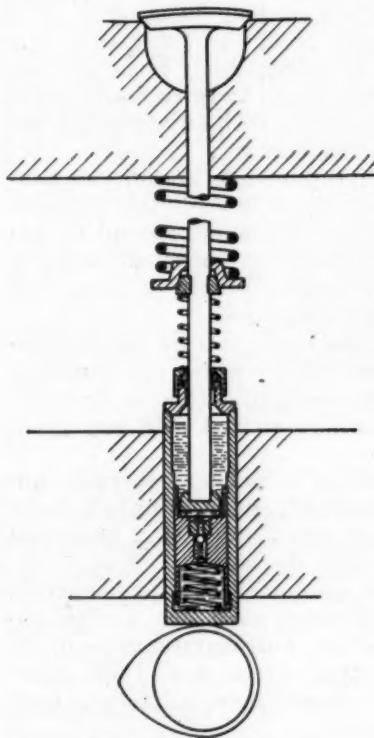
Between the piston and the end of the valve stem is a spacer, designed to permit free flow of oil to the check valve and to act as a seat for the valve stem. The cylinder is sealed by a cover, provided with a slideable stuffing box for the valve stem. A retaining spring presses on this cover, tending to keep the flexible packing tight around the valve stem and providing sufficient pressure to make an oil-tight joint between the ground conical surfaces of the cover and cylinder. The device can be applied to the push rod of a valve-in-head mechanism.

New Adjustment for Every Cam Revolution

The device is designed to take up lost motion in the valve linkage, making one new adjustment for every revolution of the cam. If high temperature causes the parts of the valve linkage to expand, thus preventing the valve from closing properly, it compensates for this condition.

Lost motion is taken up by the piston spring urging the piston and spacer tightly against the valve stem when the cam is not in the lifting position. This spring is much too light to open the valve against the valve spring, though it opposes the latter. During upward movement of the piston, oil passes through the check valve from the upper chamber into the lower. As the cam begins to lift the tappet the piston will move up practically as a unit with the tappet and thus operate the valve.

During the operation of opening and closing the valve, a minute quantity of oil escapes between the piston and the cylinder wall, because of the comparatively high



A-V-A automatic valve adjuster.

pressure which builds up in the chamber below the piston, while the valve is operated. This small amount, however, is recovered as soon as the valve is closed, because the piston spring can now press the piston tightly against the valve stem, taking in a new small amount of oil through the check valve. The small loss of oil from the lower chamber every time the valve is lifted insures the valve closing properly.

Should the valve stem expand and tend to prevent the valve from closing properly, the valve spring exerts pressure on the piston, this pressure being transmitted through the valve stem and spacer. Due to the leakage between piston

and cylinder, the piston now tends to drop not only while the accelerating portion of the cam is acting on the tappet, but also for the remaining period of cam revolution, with the result that a correct relation between the valve and the spacer against which it rests is restored.

The amount that the piston drops per revolution of the cam can be regulated by varying the piston clearance, the length of the piston and the viscosity of the oil. It is claimed that if the rate of piston drop under working condition exceeds the rate of expansion of the parts in the valve linkage, the valve can never be held open accidentally by the A-V-A.

The inventor of this automatic valve adjuster is Herbert H. Engemann.

Highway Congestion Should Be Broken Before Reaching Cities

Most traffic originates outside urban areas. It should be diverted before arriving at central point. Methods used in foreign countries may be of help in solving American problems. Money, administration, and city planning are major aspects

By Pyke Johnson
Secretary, N. A. C. C. Highways Committee

CONGESTION—the bane of the highway engineer in this country—is beginning to make itself felt abroad. While there are yet no cities in Europe where the use of the motor is comparable to that here, the medieval practice of building narrow streets has decidedly limited road floor space, and consequently the authorities in some cities are already being put to it to keep the arteries of traffic from hardening and thus stopping the circulation of commerce. Some of the means which are being used abroad to solve traffic problems are of interest in connection with efforts along the same line being made in this country.

Wherever one talks with responsible authorities concerning this subject, three aspects immediately come to light. First, it is a question of money, second of administration, and third of the actual physical problem involved. There are other details, plenty of them, but the real knots are the ones mentioned.

The financial aspect of the case scarcely needs comment. Most of the countries of the world are traveling along under heavy fiscal burdens and it follows that construction programs are nowhere viewed with any great favor.

The administrative question is not so generally understood, but the experience of London affords a valuable clue of how not to go about it. Let a bedeviled official of the Government tell the story.

"Inside a ten-mile area in London there are 29 separate and distinct highway authorities each one having exclusive control of construction and maintenance in its borough. Outside that area there are 1000 other officials in the territory immediately adjacent, each equipped with similar powers.

"Whenever a road problem comes up which is concerned with coordinated traffic, all of these men have something to say and while the needs of transportation are so urgent that we usually get there, you can readily see how much time and energy must be wasted.

"Then after we get the highway, the question of regulation within a fifteen-mile area is turned over to the London municipal police who have complete authority as to size, weight, speed and similar police powers, but no authority as to the direction which traffic may take.

"Further, nobody else has such authority. A citizen may drive his car on any street which suits him and there isn't any power in the land which can stop him. The result is that our heavy goods lorries, our buses and our private cars all seek the shortest route, and the pace of travel is slowed down to the point where everybody suffers.

"So if you ever have a chance to pass along a word

of advice to any country on the problem of congestion, tell them that the first thing to do is to get the power into the hands of a few men charged with looking at the question from its broadest aspects and qualified to act accordingly."

The third aspect, that of physical application, is of course limited by finances and here again the proposals made to the select parliamentary commission now sitting on the London traffic problem, have elements of distinct value to students of congestion everywhere.

First of all and most important in the minds of some officials, is the premise that congestion isn't at all a matter of town but of country planning. After all, these men say, traffic originates very largely outside of the city and the first thing to be done is to attempt to break it up and direct it before it gets into the city.

The first step in such a program is to by-pass through traffic and the bigger the highway official the more thoroughly he endorses this program.

The fellow from the smaller town hasn't always seen that shooting heavy traffic through on his main street only adds to his costs. In a good many cases he is still influenced by the idea that if a tourist can be forced to go through a city, he may become enamored of it and want to buy a chunk or two for a future residence. That thought is often inspired by the local merchant, but the answer of the big fellows talking this point over in the informal road conferences at Seville, was that if a tourist wants anything there is always a feeder road into a city and he is much more likely to think well of the town if he skirts it, than if he is sent into the muck of heavy traffic and loses four or five hours.

By-Pass Gains Favor

So the by-pass is gaining in favor and indeed is recognized as a definite factor in town planning.

Then again, there's the need of building large arterial gateways to the city to take care of the traffic which pours in and out all day and all night, consisting of motor commuters, local deliveries, milk vendors and the thousand and one other figures which go to make up the city's local traffic.

Once inside, the question of finance becomes more imperative than ever. For example, the solution suggested for London's present trouble by one of the biggest highway officials in England, is that there should be a non-intersecting high level road out through the slums and on to the docks. The plan would cost about \$15,000,000 and probably the return would be far greater.

In the first place, thousands would have to be taken from their homes in the slums and re-housed out in

the open country. The tenements would have to be ripped out but the result would be that property valuations would soar and the government could reap the benefit. Meanwhile the hampering heavy goods traffic which now clogs the streets of London would be moving along on a separate speedway at an accelerated pace which would in itself save millions of pounds in operating costs. In fact, it is estimated that three miles per hour would be added to the average speed of the city movement.

That's one side of the story. Another possibility is the "nibbling" policy which is recommended to all towns and cities where funds for the larger plan happen to be lacking.

What is it? Simply a matter of driving through a parallel highway here and there, widening an existing passageway a few feet, knocking out unnecessary refuges, cutting the top off of a hill and thus breaking down a limiting grade, or edging off a corner and thus giving a more gradual turn which permits more speed. Sometimes an obstruction at a turn forces traffic to slow down until hours upon hours are lost in the sum total of traffic. Again, a road may have a bit too much crown and traffic must be slowed down particularly on wet days to save skidding.

Not a sensational or snappy program that of nibbling! Not one that makes any great appeal to the imagination. And yet, listen to this from a leading English transportation expert.

Opinion of English Expert

"I don't know what city you may come from or what your particular problem of congestion may be, but let me make a suggestion. Some time when there isn't much on your mind, sit down with a map of your city in front of you. Trace out on it the principal points of congestion and the course of the traffic which brings out the congestion.

"Then take your pencil and see how much work would be necessary to give you two or three alternative parallel routes. You will be surprised to find how much can be done. London is doing it today."

Well, after one has travelled through the maze of finance and administration and physical application, he finds there is still another means of helping things out and that is found in the regulation of the traffic itself.

Turn again for a moment to the British situation. Whenever the people of the United Kingdom are faced by a perplexing problem they go to Parliament and Parliament creates a commission. That commission is headed up by a responsible government official who gathers around him the practical, hard-headed leaders of all of the interests which will be affected by the decision made.

Such a commission has been dealing with the motor problem in England, and the deliberations while not yet finally concluded offer much food for study by the student.

At the moment we are only concerned with one of them, but it hits so close to the heart of the problem of congestion that it is worth giving space to it for the consideration of highway and other officials everywhere. The subject is speed.

Boiled down, the British commission has concluded that the basic trouble with traffic is that it isn't moving fast enough. Given a limited floor space, the number of vehicles which can traverse it, will be determined by their rate of speed.

Of course, first and foremost there's the safety of life, limb and property, and don't think for a moment that any Englishman overlooks those items. All right!

First, a stringent reckless driving clause. Second, penalties behind that which will be enforced and which are sufficient to make the most blasé road hog ponder well before he chances violating them. Then word to traffic to get out of the way as fast as is consistent with public safety even to 40 miles per hour.

Thus far these provisions are only recommendations but far from being equivalent to similar action by a committee of Congress, these recommendations are almost certain of enactment.

Paris is handling its traffic on that basis already. Four lanes of traffic on the Champs Elysees are divided into slow and fast movements. Get on the inside and all you have to do is to travel.

As a starter, highway officials agree that this provision is a sound one. Then comes the nibbling policy and finally, if the money is available, the short cut is the big plan provided that behind it is a sound understanding of country as well as town planning.

There is one point of discussion, however, that should be made clear, and here again we turn to a battle-scarred veteran of many hard fought highway campaigns.

"Generally speaking the highway official who is competent to hold down his job already has a pretty fair plan to cure congestion in his town or city. It may be even that he has the whole thing worked out down to the final estimates.

"But the highway official is only one cog. After all he is the administrator who is supposed to follow the mandate of the citizenry and do the job which they give him. The task of stirring up public opinion to see the need for the big plan can't be undertaken by the man whose bread and butter depends on it.

"The fellow on whom the ultimate responsibility rests is the chap who is selling transportation or real estate, or who is a banker or otherwise one of the big men of the town and until he begins to get his friends into the campaign, progress will be slow."

And since the formula involved is one of human nature, the principle works out just the same whether the town be London, Paris, Buenos Aires or Main Street, U. S. A.

U. S. Exports to Switzerland Increase

THE most striking feature in the Swiss automobile trade for the first quarter of the present year for which official returns have just been published is that the imports from the United States have considerably increased again.

The value of the total imports during the first quarter of 1922 amounted to 5,300,000 francs as against 6,400,000 francs during the first three months of the present year, a gain of 1,100,000 francs. To this total France contributed 2,868,000 francs; Italy, 1,235,000 francs and the United States, 1,122,000 francs.

Imports from Germany have fallen off, amounting only to 719,000 francs. In 1922 Germany still took third place.

The above figures include motorcycles, chassis, passenger and freight cars, although two-thirds of the total imports represent upholstered passenger cars. Chassis valued at 266,000 francs and upholstered passenger cars valued at 757,000 francs were imported from the United States. Imports from France consisted of chassis valued at 324,000 francs and passenger cars at 2,445,000 francs.

Great Britain is still leading in the imports of motorcycles. United States imports having risen only lately, with the Nera car motorcycle predominating.

Exports of Swiss automobiles during the first three months of 1923 amounted only to 1,059,000 francs as against 494,000 francs during the first quarter of 1922.

Standards of Quality Are Maintained by Special Department

New division has task
of coordinating needs
of factory and car owner

By W. L. Carver

IN order to focus at a common point the best interests of the customer, the ideals of the engineering department and the requirements and procedure of the manufacturing department, the Packard Motor Car Company has inaugurated a quality engineering department. The purpose of this department is not only the maintenance of a uniform standard of quality throughout the entire production but also constant study and investigation from every angle toward any improvement consistent with the standards of the engineering, manufacturing and service departments.

Two men, designated as quality engineers, are at the head of the new division. One of these men devotes all of his time to consideration of the chassis and mechanical details, the other to bodies, finish, upholstery, etc. These men have been selected for their respective posts because of their long experience and familiarity with every phase of the company's effort and an ability to analyze causes and effects to a definite, tangible conclusion. Both of them have built and tested experimental cars and new models, have held executive positions in the production and inspection departments and have traveled the country over on service and investigation missions. The men under their supervision have been placed in this department by reason of ability to investigate thoroughly and soundly, through technical training and practical experience.

Although closely related to every department of the company, the quality engineers are responsible only to the vice-president in charge of manufacture. Their findings and reports are transmitted through him to the rest of the organization. In an organization and plant of Packard's size, it is practically impossible for the manufacturing executive to give his personal attention to the manifold details of car production. As a matter of necessity, a great portion of his time must be devoted to consideration of broad policies and the anticipation of trends in means of production and man power. By means of the quality engineers department, the executive in this case has delegated his supervision, tempered by long experience and broad viewpoint, to an active force that is actuated by like characteristics. As the efforts of this department are not distracted by other external considerations, an additional advantage of concentration along one line of effort results in a continuous maintenance and improvement of standards.

The work of this department extends along several lines, including among others the following:

Unlimited contact with every detailed operation involved in the production of assembly of the car.

Selection and removal of one car per day from the shipping room for thorough inspection.

Two men, designated quality engineers, have been given the job of looking for trouble before it occurs at the Packard plant. This article tells why the new department has been established, how it operates, and what it accomplishes.

Analysis of service reports and investigation of possible contributory causes.

Interpretation of limits consistent with engineering standards and shop requirements.

Check-up of test and inspection departments.

Cooperation with dealers and the dealers' service men.

Education and instruction of the customer.

Protracted test and observation of new theories or arrangements.

While travelling through a plant upon a definite mission or a general tour of observation, it is a comparatively simple matter for an experienced man to spot possibilities of troublesome operations or spoiled work. In many cases the attitude or lack of definite method of the workman will indicate that something is wrong at a machine or assembly station. A jig may be fouled with chips, set up incorrectly or the wrong sequence of operations attempted with the possibility of slightly incorrect workmanship finding its way into the finished product. The members of the quality engineers department immediately investigate and remedy any situation of this nature.

The axiom of the department is "Look for trouble before it occurs." Due to constant contact with every detail of manufacture, any deviation from correct routine in any part of the plant is quickly discernible and is the subject for immediate attention. Intimate study of any operation or group of operations also follows upon analysis of service complaints, the object being the determination of the effect of manufacturing procedure on the performance of the car in the customer's hands.

Test Car Selected

Each day, one car is selected at random from those assembled in the shipping room for delivery to dealers. This car is then driven and examined from the standpoint of its performance in the hands of the customer as related to the standards set up for manufacturers. While on the road, particular attention is given to performance at every speed. A careful search is made for gear noises, body squeaks and rattles of any nature. Ease of steering and gear shifting is checked and doors and windows are tried. The car is then taken to the headquarters of the department and run on to a stand to permit convenient access to the rear axle and the crankcase pan. The mesh and tooth contact in the rear axle are checked while at least one rod bearing is taken down and the clearance checked. A standard clearance of .002 in. is specified. Therefore the rod is assembled with a .002 in. feeler gage and must be tight or the bearing fitting line comes in for investigation. Clearance between pistons and cylinders as well as alignment is also inspected carefully.

Body finish, upholstery trim, body hardware and curtain or window fit are checked thoroughly. Templets allowing a variation of $\frac{1}{2}$ in. are applied to the seat contours and upholstery of each individual model. The fit of the hood with the cowl and radiator is checked as is the fit between the fenders and the body or chassis. Finally, the setting of the carburetor and ignition units is noted and any deviations from standard procedure are immediately investigated. This policy, following upon the double road test and the final test-stand run, has been found to result in any exceedingly uniform quality and performance.

Technical Reports Tabulated

Reports of the technical service department are carefully tabulated and turned over to the quality engineers. Each kind of complaint is investigated for the determination of its cause. Where the complaint is sporadic and dependent upon the peculiarities of a customer or condition, service letters which deal with the origin and elimination of the particular trouble are formulated and passed on to the service department who in turn circularize the entire dealer organization. If analysis of the complaint points toward manufacturing or inspection methods, or possibly unsatisfactory limits, a thorough, first-hand investigation is made by the quality engineers and a more adequate routine is established. In a small number of cases, recommendations are made to the engineering department for slight changes which will help to insure consistent high quality of manufacture and performance.

Another activity of this department is along the line of establishing a common ground for the engineering and production departments in the way of limits and clearances. Oftentimes an engineer will lay down limits which appear to the production department as too stringent and inconsistent with the desired quality of workmanship and performance. The function of the quality engineering department in this case is to establish the manufacturing procedure which is essential for the ideal of performance. Sometimes an element of arbitration is introduced, while under different conditions the department cooperates with the shop in working out methods of production and inspection which will satisfy the conditions imposed. Limits and clearances are interpreted to the shop with a full realization of their relative importance to the car's service in the hands of the ultimate customer.

Quality Carefully Checked

The equivalent of the management's check-up of the inspection and testing department is provided by the constant attention of the quality engineering department. A super-inspection results and tends to keep both departments keenly alive to their respective responsibilities. As the quality engineers and their assistants are aware of the effect in service of any let-down in quality, any tendency in that direction is immediately checked. Any unwarranted variation in the machining or finish of parts is brought to the attention of the inspection department and more thorough methods indicated when deemed essential. Finished work in the assembled car is not depended upon as indication of the tendency toward variation as much as observation along the line while parts are in process in the shop.

Testing of the various units as well as that of the chassis and finished car is watched closely and operators' and drivers' reports are carefully scrutinized. During the writer's visit at the plant, a steering gear was delivered to the department with the driver's report of rattling in operation. In this instance, which is typical, the steering gear is torn down and carefully checked in each detail; if any defect of parts or assembly is found, immediate action at the source is taken. If nothing is

found to be incorrect, the same component parts are again assembled and placed in another car which is turned over to the same driver. If he has no further criticism, it is evident that the suspected rattle was not in the steering gear but at some other point. This procedure spurs testers and drivers to careful analysis of any suspected troubles, eliminating snap judgments and a great share of misdirected effort.

Every car manufacturer has at some time in his existence been confronted with a so-called lemon, a car which will not perform and apparently will not yield to treatment in final test. In the routine that Packard has established, a car of this character is turned over to the quality engineers department. It is then entirely torn down and a careful examination of every condition is made as each part is removed. Any unusual circumstance is investigated and deviations from standard practice noted. Every part is carefully gaged and inspected and the car is finally rebuilt according to standard practice. This procedure usually develops the fact that some departure has been made from the standards of manufacture. The responsibility for the trouble is reported back to its source with recommendations for the avoidance of a recurrence of the same trouble in the future.

Dealer Ideas Considered

Occasionally, a dealer or his service man will develop some original ideas of adjustment or care that is given certain parts of the car. Very often, this originality is followed by trouble and complaints from the dealer's clientele and some instances result in a dissatisfied dealer who feels that the factory is not taking care of him. The dealer sometimes runs into trouble because of his lack of knowledge of the plant's ideals, permitting cars to go to the customer which are not in accordance with standards of performance that constituted his sales claims. In either circumstance, Packard sends out a member of the quality engineering department who goes into the dealer's problem in a thorough manner. With his background of intimate knowledge of every detail of design, manufacture, inspection and testing, this representative can cope with the dealers' troubles and point out the deficiencies and remedy.

This branch of the work not only is of immediate benefit to the dealer but also serves to keep the members of the quality engineering department in close touch with the requirements and contingencies that arise out in the field. This knowledge is in turn applied to the standards of the department in improving future specifications.

The same form of contact takes place with the isolated owner or the owner who is interested sufficiently to visit the plant. Thus dealer and owner angles are acquired by members of the department. The viewpoint of members of the department is enlarged so that the needs of the dealer and driver become as important as the internal regulations and standards at the plant.

Wide Contacts Obtained

Contact with the current ideas and developments of the engineering department is obtained in a somewhat similar manner. Whenever any new adjustment or experiment is to be tried, particularly one requiring some time for its thorough demonstration, the job is turned over to the quality engineers. For example, the value of a new type of piston can be demonstrated only by a considerable amount of service with frequent examination and confirmation of related conditions. The experimental car in this instance would be turned over to this department for frequent investigation. If the new development is finally adopted as standard equipment, the department will be thoroughly familiar with the design and its characteristics as related to performance on the road.

By means of this variety of activities, the quality engineers and their lieutenants are constantly in the closest touch with every phase of the car's progress from the drafting board to hands of the ultimate owner. This factor added to their experience makes them thoroughly appreciative of the relative importance of each detail of the car's construction and performance as a part of the whole perspective. The latter quality which has been ascribed to one individual in most cases in the past is

made more vital and of more tangible commercial value due to its attachment to an active, specialized organization.

One portion of the manufacturing executive's function has been amplified and intensified in a way that can only result in constant improvement in car performance and manufacturing procedure. Ultimately, the incidental expense must be reduced in a like measure as the economy of forestalling trouble before its inception is axiomatic.

Straight-Line Center Lift Feature of New Window Regulator

COMPLETE lock-board mounting and a straight line center lift are the most novel features of the Q and C window regulator. In addition to these features, this regulator permits approximately 21 in. maximum travel with about three revolutions of the control crank, and locks the window securely in any desired position.

As illustrated by Figs. 1 and 2, the regulator utilizes the pantographic action of a parallelogram of levers and linkage to produce a straight-line motion at the end of the lifting lever, which is connected to the center of the window frame by a rivet pin in a slot. This form of linkage has been used to some extent in steam-engine practice, but this device is unique in that both lever arms of the parallelogram are manually actuated, and as the mechanism is placed on both sides of the mounting plate, motion of the outer end of the lifting lever across the fixed center of the mechanism is made possible.

Manual operation is obtained by the usual crank, which is located on the inside of the lock-board. This crank is mounted on a shaft which carries a pinion on its inner end and an expanding spring locking clutch at its middle portion. The clutch consists of a small coil spring which fits closely in a stamped steel housing that is riveted on the mounting plate. The wire at the ends of the spring coils is turned in radially and engages with the operating crank and shaft. Operation at the crank end of the shaft tends to release the clutch, whereas any load at the pinion end tends to lock the clutch more tightly at the set position.

The shrouded pinion meshes with a stamped sector of 120 deg. magnitude, which is carried on two pressed steel arms about the fixed center of the mechanism. The longer of the two arms extends beyond center and carries a pivot pin that is centered in the lifting lever, forming with the short end of that lever, two sides of the parallelogram. The short end of the lifting lever is offset and passes outside of the end of the mounting plate to permit travel over the center of the mechanism. In this way, part of the linkage may be placed on each side of the mounting and interference to travel above and below center is eliminated. The shorter arm of the two carrying the sector also carries a pivot pin that centers in the first link of a reversing mechanism, the purpose of which is the simultaneous actuation of the short lever.

The reversing mechanism, which may be traced by referring to Figs. 1 and 2, is introduced for the purpose of rotating the short lever in the opposite direction from that of the long lever of the parallelogram. By this means, the 21-in. travel of the outer end of the lifting lever is assured and the possibility of the linkage locking at any point due to toggle action is eliminated. Duplicate links are mounted on each side of the mounting plate, each being supported at one end by an idler pin that slides in a slot. The opposite end of the second link centers through a pin in one leg of the L-shaped lever, which is mounted freely

on the fixed center just back of the coil spring in Fig. 1.

The other leg of the L-shaped lever forms the short lever in the parallelogram and through the link which is supported by a pin in a second slot, forming the fourth member of the parallelogram, actuates the short end of the lifting lever. The spiral spring which opposes the weight of the window is mounted on a square head of the sector shaft at the center and anchored to the reversing lever at the outer end. Thus the two ends of the coil rotate in opposite directions; when the sector moves through 120 deg., which is its maximum travel, the spiral spring is deflected through 240 deg. In addition to counterbalancing the window, this spring throws a load on all the bearings of the mechanism and prevents rattling.

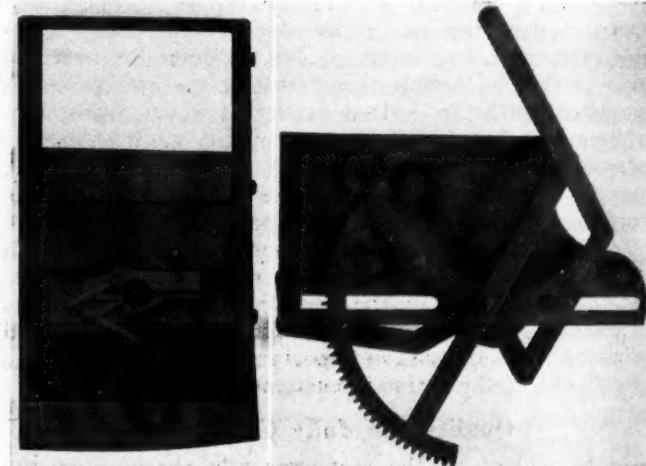


Fig. 1—Position of new window regulator when installed

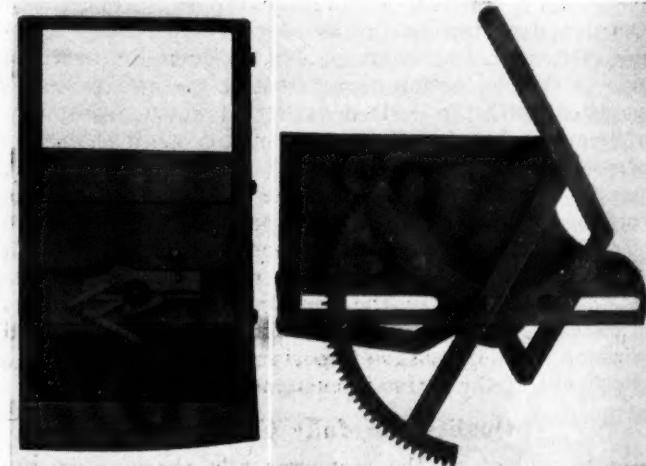


Fig. 2—Detail view showing parallelogram of levers

Approximately three turns of the crank move the sector through 120 deg. This motion swings both the lifting lever and the fourth link of the parallelogram through 120 deg. and results in a window travel of slightly more than 21 in. Although capable of this extreme travel, this regulator is also suitable for the control of the windows in the rear quarter in addition to those in the doors. The action may be stopped for any desired length of travel and is uniform and smooth throughout its range. As the window and the regulator are supported entirely from the lock-board, the necessity for additional plates or boards at the bottom of the door or body structure is obviated.

Any reasonable divergence of the planes of the window travel and the regulator mounting is taken care of by the length of the pin in the outer end of the lifting lever.

This regulator, which has recently been placed in production, is made and sold by the Q and C Co., which, after a long experience in the railway specialty field, have created an automotive division in Detroit.

Sell Automotive Products for Christmas Gifts

Idea can be applied to nearly every unit from cotter pins to passenger cars. Accessory manufacturers are putting over new campaign. Factories can develop ideas and coordinate efforts.

GIVING of useful gifts at Christmas time has become widespread in recent years. The ideals propagated by the Society for the Prevention of Useless Giving are gaining more adherents every December. This trend is very favorable to the sale of automotive products as Christmas presents.

With nearly 13,000,000 families owning passenger cars in the United States, the opportunity for selling useful automotive gifts is tremendous. Cars are run clear through the winter in most cases, so that a part, accessory or vehicle will be of immediate value to the recipient of the gift. Greater use of closed models increases the range of possible presents. All of these factors combine to make the present time especially suitable for the development and execution of Christmas merchandising ideas.

It probably is easier to get people to spend their money between Dec. 1 and Dec. 25 each year than during any other similar period. The Christmas spirit makes family budgets little more than a name and digs deep holes in savings accounts. It causes people to buy for their relatives and friends things which have been desired for many months. Men purchase articles which they have wanted for a long time and give them to their wives for Christmas presents. In return, wives add to the family possessions articles which they have been unsuccessfully urging their husbands to buy.

THE presence of this will-to-spend may be something of a joke around the family fireside, but it is worth serious consideration by retail merchants and by the manufacturers who make products for individual use. Manufacturers in nearly every line have made literally millions of dollars through definite merchandising appeals built around the Christmas idea.

Makers of automotive products really have begun to use Christmas as a business booster only in the last four or five years, despite the fact that dry goods producers, book publishers and other manufacturers have been working the idea overtime for several decades.

Christmas merchandising has been carried further by accessory interests than by any other group in the automotive industry, although the holiday note has been sounded extensively by vehicle builders in their selling efforts. Taken as a whole, however, automotive manufacturers have not cashed in on Christmas merchandising as fully as they might. The financial success of work that already has been done along this line, however, is resulting in greater efforts each year.

Accessories, naturally, are thought of first when automotive Christmas gifts are mentioned. The units are small, relatively low in price, and lend themselves to wrapping in Christmas trappings. They warrant special attention, too, because the sale of equipment items is normally small in the winter time. Consequently, an opportunity to raise the sales curve is welcome.

Aided by manufacturers and the trade press, notably *Motor World* and *Motor Age*, dealers have raised winter equipment sales materially in the last few years by selling accessories as Christmas presents. The idea is being

pushed further this year by the Automotive Equipment Association, which is putting on a special campaign with the slogan "Something for the Car for Christmas." With this as a basis, the association is sending educational literature to dealers, telling them specifically how they can put the plan into operation and how they can cash in on the idea.

Christmas merchandising plans are applicable to practically every kind of automotive product from cotter pins to passenger cars. The chief thing needed is to implant the idea in the mind of the retail merchant and then help him in every way possible to put it across.

THERE is every reason for car manufacturers to develop activities along this line. December is usually a month of small sales. All the new models to be announced before the shows have usually been made public and there is a general tendency to hold up buying until the big exhibitions in January. The selling impetus of the shows would be just as great if Christmas gift sales were encouraged. Only in a few cases would a December sale mean a sale taken away from January or February.

Increased use of closed cars has made Christmas selling more feasible than in the past and the development of specific merchandising ideas for use by dealers will be well worth while.

Factory sales departments in all lines of automotive manufacture will have to be responsible for a large share of the Christmas selling ideas. Whatever thought is going to be given to this subject for the coming December should be produced at once. Ideas have to be developed early in the fall. Then there is sufficient time given to get them across to the retailers who are to execute them.

Factory literature, traveling salesmen and advertising copy all can be used as media for putting over Christmas sales plans.

THE leading dealer papers are helping materially to sell dealers on Christmas merchandising and will be a big factor in supplementing factory efforts along this line. Automotive dealer publications not only are showing dealers the advantage of cashing in on the holiday spirit, but also are pointing out specific ways and means of doing it. *Motor World*, for example, started the ball rolling with an article printed in July which showed the opportunity for Christmas profits. It is following up with another one in August, based on the "Something for the Car for Christmas" slogan, and will have others of similar character every week or two up until the end of November. *Motor Age* will develop the same ideas from the standpoint of the service man, and will show how to make money from Christmas sales.

The combined efforts of manufacturers, jobbers and trade press should go far toward increasing winter business in 1923. New ideas will be developed and old ones will be carried out more effectively than ever before. Now is the time to begin work, as national advertising, dealer publicity, and many other factors must be coordinated if the plans are to yield maximum results.

Addition of Simple Fixtures Lowers Manufacturing Costs

Accessory and parts production often demands considerable flexibility in equipment. Efficiency can be increased without raising overhead expense. Special grinding process simplifies work on horns. Methods, described in detail, are found useful.

WITH the rapid expansion of the automotive industry, many plants, both large and small, have been withdrawn from other fields and diverted to the manufacture of parts and accessories. A great share of these plants are organized and equipped for either the general run of contract work or a line which is in a large measure unrelated to the specialized automotive parts plant. The executive responsible for the quantity and quality of production in plants of this character is confronted with problems that are peculiar and unlike those of the plant which has been equipped from the ground up for the production of a specialized part of the automotive field.

In the first place, the owner, or whoever pays the bills, is loathe to set up a capital charge for specialized equipment. There is a well founded prejudice against hypothesizing possible temporary profits by saddling them with a carrying charge for increased equipment. The usual manufacturer is content to get his feet wet before jumping into the sea of expansion. Nevertheless the possibilities of profits from a full shop cannot be permitted to go glimmering because of normal conservative business policy. It is only natural that plans for a new line should be based on existing equipment plus a minimum of investment for special fixtures and modifications.

At this point the need for keen planning and judgment on the part of the production executive becomes apparent. Unless the company is making and marketing a complete device with little or no competition, the margin of manufacturing profit is usually small. Ordinarily the sponsor of an accessory or specialty is compelled to beat down unit costs in order to leave an adequate margin for sales and advertising.

The parts maker is therefore compelled to whittle his

manufacturing costs down to the absolute minimum in order to justify taking the business at a price. Unit prices for each operation as well as overhead charges for inspection and equipment must be definitely set at the lowest possible figure.

Another factor which must be reckoned with is the changing nature of the specialty business. The market for accessories and specialties is in a state of constant flux and is subject to the whims of seasons and styles. Therefore the parts maker must constantly guard against the installation of too specialized machines and equipment and resort to temporary expedients which will bring about the specified quality at a competitive price.

Small Changes Important

Although this form of equipment and shop procedure is primarily expedient in nature, it is none the less a fundamental part of plant management. What may be an expedient today may lead to a broad-gaged development tomorrow. In fact, some of the best machine tool developments of the present day are the results of somebody's thoughts along the line of obtaining just a little greater production at a lower cost with no appreciable increase in investment. Many of the big producers are bending their efforts toward the utilization of standard equipment in the production of specialized operations by the same policy of adapting the machine to the work at hand by the addition of simple, cheap fixtures. The industry as a whole is progressing too rapidly for the establishment of either methods or equipment entirely upon present standards.

In line with this thought, several different operations with the incidental equipment are discussed here in detail. This equipment has proved to be both successful in operation and profitable from the standpoint of unit costs. At the same time, simplicity and economy of construction have been important governing factors in each instance. As work of a general nature is handled, a wide range of operations is discussed, but the fundamental principle applied to each case is the same. This equipment has made competitive prices possible and profitable with an unusually small expenditure for the adoption of equipment to the different specific operations.

The gray iron casting shown by Fig. 1 is part of an automobile horn. All of the holes are produced at one operation by means of a Sellew drill head on a Taylor & Fenn machine, an ordinary drilling job, after the flat faces have been disc ground at an equally satisfactory rate.

Disc grinding was adopted for the facing operation after some other methods had been tried and proved too slow. It will be noted that the bosses *A* and *B* and the ends of the lugs *C* and *D* are to be machined in parallel planes and at a distance from one another which must be well definitely within 0.002 in. Separate grinding opera-

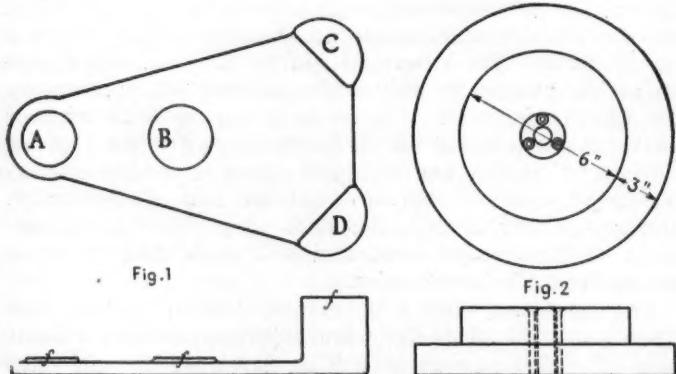


Fig. 1—Light gray iron casting which is finished at surface marked *f*, in one disc-grinding operation. Fig. 2-Line drawing of the built-up wheel which was developed for this operation

tions upon these two planes were altogether too slow and failed to produce the required parallelism.

Four Spots Surfaced at Once

By means of the two-plane disc wheel shown in Fig. 2, all four spots are surfaced at one time. The work pieces are held free hand and are pressed against the disc wheel until the four spots clean up. There is sufficient clearance on the work and enough width of disc surfaces to allow the workman to move the castings and thus wear down the abrasive evenly. From five to six hundred pieces of a quality exceeding that obtained by other methods are produced per hour. Much time is saved because the workman is freed from the necessity of gaging the height.

Economy of discs is another feature of this tooling. Twelve-inch Manning cloth circles are taken from stock and are cut by means of a shop made hand tool into a ring and a center disc that just fit the two-plane disc wheels.

Grinding of all kinds is ordinarily done wet, but in one case dry grinding on a Pratt & Whitney surface grinder has eliminated complications resulting from the residue left by the coolant further along in the work. The parts are cast-iron rings and blocks. For sizing them brass pieces are used as gages.

The operator grinds to within 0.002 in. of the upper limit by the feel of a brass height gage laid alongside the work. The brass gage is then removed and the grinder head is brought down by a known movement of the vertical feed wheel to the required finished size. There is so little wear of the wheel for a finishing cut and the finders are so accurate that no trouble is experienced in holding the work to snap gage limits by this method. Some of the work requires closer limits; for this a brass piece of the correct height is placed alongside in parts on the grinder table. When the wheel brushes have brass pieces the correct height is obtained at the work.

Effect of Brass Gage Pieces

There is a relation between dry grinding of cast-iron and the use of brass gage pieces. If a steel or iron gage block were used, it would become magnetized sufficiently to collect fuzz and dust and would have to be wiped every time it was used. Being non-magnetic, the brass pieces may be used continually without becoming affected by the magnetic chuck and a method that would otherwise be impractical is employed to great advantage.

One of the mechanical horns on the market has a striking wheel, as shown in Fig. 3. The blanks are punched from 3/16-in. plate and the hole is rough punched. Then the hole is sized by a reamer held in a drill chuck; this operation prepares the blanks for cutting the teeth in a milling machine.

Special fixtures are used for centering and indexing. The operator is supplied with two arbors, one of which he loads and unloads as his cut is running. A cutter forms two complete teeth at a pass. After cutting, the wheels are tested on a fixture similar to that for testing gear wheels, and those which are more than 0.001 in. out at the ends of the teeth, or lobes, are rejected and sent back for correction.

The heavy cut, the slender arbor, and the close limits make this a trying job, if done in a production way. To meet the requirements, the fixture designed includes the features shown by Fig. 4. A is the arbor, in part, on which twelve blanks are loaded. They are drawn by a nut on the small end and shoulder at the large end which afterwards drops in the special center. Some of the wheels may be seen at WW. Between each pair is a dollar C having bore and periphery ground, all collars being alike.

A portion of the base of the fixture casting is carried

up and appears at B, where it is slotted and fitted with hardened steel strips RRR. These strips are of such a height that the collars just touch on them and support the slender arbor against bending during the heavy cut. Sideways, the strips are spaced to compensate for the slight differences in loading. It has been proved that the time when the hob "cuts air" between the blanks is much less than that lost by other methods of producing an equally satisfactory job.

A novel method of making $\frac{1}{2}$ in. dia. x 2 in. long studs with U. S. Std. thread has been worked out. After making them in the usual way by cutting the pieces to length

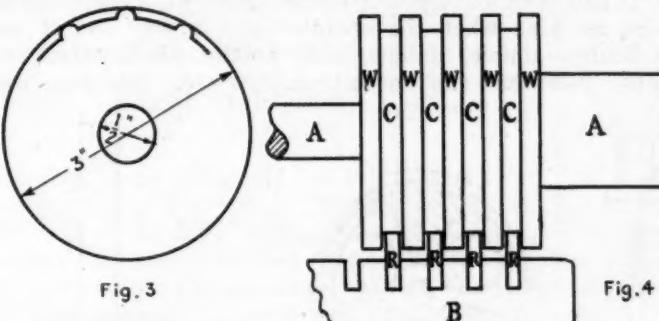


Fig. 3—Profile of striking wheel of mechanical horn which was produced in a milling machine.
Fig. 4—Assembly of striking wheels, spacer discs on milling arbor with hardened steel support blocks

first, it was decided that the unthreaded portion was an expensive luxury that served no good purpose. This opinion opened the way for continuous threading. The operations follow:

1. Cut $\frac{1}{2}$ in. dia. bars to 6 ft. length in a shear.
2. Point one end slightly on a grinding wheel.
3. Thread full length on a Wells bolt cutter.
4. Run threaded bars through an automatic cutting-off machine, where they are nicked every two inches by a V cutter.
5. Clean burrs from threads with a revolving wire brush.
6. Break studs off in a bench fixture, foot operated.

This method is extremely cheap and turns out studs equal to any, with the exception of the appearance of the broken-off end, which is unimportant on this class of work. Cutting bars to length and pointing do not add a second's time to the labor cost; neither does the final operation of breaking off to length.

Threading the long pieces necessitates stopping the bolt cutter when the cut has run its full range, but the process withal is as fast as any other method. Opening dies are used and some slight alterations in the machine were made to facilitate the work. From the bolt cutter, the pieces go to the cutting-off machine, which is an old one, stripped and altered for this one job. The single tool cuts a V notch which serves the dual purpose of forming a breaking point and of beveling both ends of each stud. The tool cuts below the root diameter of the stud, weakening the bar so that it breaks without trouble but is strong enough to stand up under the next operation.

All cutting-off and beveling tools turn some metal over into the thread and thus hamper starting a nut on the stud. These long threaded bars permit a novel process that opens up this thread in first class shape. A light grinding stand has been rigged up with guides and equipped with a wire brush running at 1800 r.p.m. The rods are started between brush and guides and run themselves through in much the same manner as on a centerless grinder. The brush cleans up any chips from the threads, smooths them up slightly, and opens up the threads that the V-shaped tool turned down.

Fig. 5 shows a stud for a Ford accessory that is made on a Hartford automatic screw machine. These automatics, which are of the earliest type and are no longer built, have a single spindle served by a turret that revolves about a vertical axis. The machine was admirably adapted to making the stud shown but unforeseen difficulties appeared when the tooling was tried out. It was found that there was not sufficient room for the tools to revolve after the bar had been fed out for necking, with no possibility of changing the cams of the turret to avoid this interference.

It had been decided to place the piece on a more expensive machine when the operator saw a way out of the difficulty—simple, unique, and worthy of imitation on other jobs that run uncomfortably close. His plan was

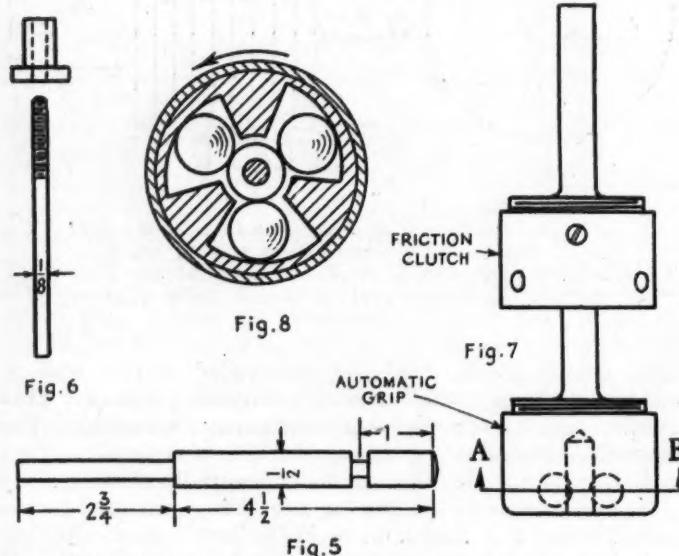


Fig. 5—Special stud which was produced in a modified screw machine of obsolete type. Fig. 6—Stud and butt which are assembled in a novel way. Fig. 7—Automatic Butt Setter equipped with friction clutch. Fig. 8—Cross section of the automatic gripping device

to add two more cams to the two already serving the feed and the chuck. With these, the chuck was released at the proper time and the bar drawn back into the spindle far enough and long enough to permit the turret tools to pass. The bar was then returned to position and cut off.

The rod and butt shown by Fig. 6 are assembled for one "gas saving" carburetor. A hole is tapped through the but, which is screwed to the end of the rod thread. A pre-determined tension or tightness on the rod is of greater importance than exact position.

The butt is started on the thread by hand and then boxes containing these parts are taken to sensitive drill. There they are run all the way on, until they fit acceptably tight, using the tool illustrated by Fig. 7 as a driver and friction setter. A fixture having a simple quick-acting clamp is secured to the drill table and the rods are grasped in this, thread end up. The spindle with tool in it is always running; bringing it downward causes the gripping jaws to take hold of the butt and screw it home. As the clamp on the rod is released, the grip on the butt is also released. And when the spindle is raised the part drops out and into the receiving box placed below.

Tool Held in Chuck

Referring to Fig. 7, the shank of the tool is turned so that it may be held in an ordinary drill chuck. Its lower end flanges out and becomes one member of the adjustable friction clutch which sets the butts at the desired

tension. This friction clutch is of the flat fiber disc variety.

To grip the butts without stopping the machine to insert them and to compensate for commercial differences in size, an automatic gripper is used. As may be seen in Fig. 8, this is a unit about the size and shape of the friction clutch. It consists of three steel balls, loosely confined and restrained tangentially by cam-shaped surfaces. The sectional drawing shows the relation of the balls to the gripped butt and the cam faces. No springs are required, as the grip increases with the tension but releases entirely when the stationary resistance of the strain is released.

Three-Way Valves

Some three-way valves for use on a kerosene burning attachment were being run through the shop. They were of the taper hole and ground plug variety. To prevent leakage of kerosene and gasoline, any valve has to be very well fitted. The shop turned the taper plug in one cut, reamed the valve in the cored hole and ground the two with sand, with less than two per cent rejection on test. The sand was just clean white sand, which looked a little coarse for such nice work but, as it pulverized during the grinding to suit the finish desired, produced perfectly ground surfaces. The plugs were dipped in machine oil and rolled in the sand just before the grinding operation. This process produced a better job in less time than any marketed product that had been tried.

In the same shop some body fittings which are partially constructed of beechwood are produced. A number of holes are required for $\frac{1}{8}$ in. screws and tie rods. Formerly these holes were bored with a wood bit. As a quicker method was desired, experiment demonstrated that the holes could be punched. Now all the holes are made with a punch and die, just as in metal working practice, except that the punch is made with a cup-shaped end. As a result, the work is done in less than half the time.

As part of a Ford accessory, a coil spring with a right angle bend and a loop at each end is used. These springs are made from bright wire, but as they drop from the four-slide machine they are dull and more or less oily. As appearance counts, the problem was to clean them cheaply. It was solved here in a simple manner.

Springs Caught in Boxes

The springs caught in wooden boxes about 18 in. square and 6 in. deep and then passed on to the assembling bench. Cast-iron flanges were screwed to two ends of each box and a $\frac{3}{4}$ -in. dia. rod passed through and retained by set-screws. A light framework was built with two split bearings and provision for belt connection. Each box of springs is put in this frame, a pulley slipped on the projecting shaft, a lid clamped on, and then revolved slowly for half an hour. Sawdust is used as a vehicle and when uncovered the springs are clean, dry and bright; better still, they are not tangled up but are ready to pass to the assemblers.

Casual inspection will reveal a rubber gasket firmly seated in the tire connections at the roadside free-air stations. Some of these gaskets are held in by a threaded piece and others are snapped into a turned recess. The latter is the cheaper process from a manufacturing standpoint and holds the gasket exceedingly tight. In one case it was found that the cost of inserting these gaskets was greater than that of the balance of the work on the connection, because the rubber refused to seat without laborious coaxing with a hand tool. The solution proved to be dipping the gaskets in an emulsion of glycerine soap. When supplied in this way, an operator could insert them with a bench tool as fast as the parts could be picked up.

Uniform Traffic Code Helps to Make Highways Safe

Ohio adopts rules covering entire State. Standards acceptable to all commonwealths might be worked out. Agreement on general principles not difficult to obtain, but differences arise when specific measures are discussed. Local conditions vary.

O HIO has set a good example for other States by the adoption of a uniform traffic code covering the entire commonwealth. When municipal ordinances or regulations come into conflict with its provisions, the State code naturally takes precedence. The law may not be perfect and few laws are, but it at least makes use of the highways safer by providing the same rules to cover all users of them.

Such simplification of regulation is sadly needed throughout the country. No motorist who strays far from home, for example, can be expected to know intimately the multiplicity of rules laid down to govern his conduct. Ignorance of the law is held to be no excuse and many a motor vehicle driver has been arrested in some strange city for doing what failure to do at home would have resulted in a summons at least.

Americans are an itinerant race. They like to travel, especially those who own motor cars. Taken by and large they are a peaceful, careful people who shudder at the thought of getting mixed up with the police or causing an accident. They want to obey the traffic regulations of every town or State, but it's a tough job.

Standardization Sought

Efforts have been made for years to obtain the adoption of a uniform traffic code, but the work seems to have been abandoned as hopeless. General principles have been accepted readily enough, but when it has come to working out the details there has been a distressing lack of harmony. Even the automotive interests haven't been able to get together entirely.

There may be some sound reason why a code can't be worked out which will be fairly acceptable to all States, but if there is it is exceedingly illusive. Even uniform general principles would be better than nothing. State and municipal authorities are bent upon enacting drastic measures which will reduce the accident hazard, but they could take no longer or simpler step than to agree upon some simple code. It might need subsequent amendment but it would afford at least a working basis.

The motor vehicle is playing altogether too important a part in the life of the nation to justify its use as a political football. Political considerations have all but ruined the railroads and most other public utilities. They have been the victims of the regulatory mania of demagogues.

At least 90 per cent of all motor vehicle users are perfectly willing to submit to sane regulation and fair taxation. They are good citizens. They want to promote safety and they want to bear a just share of the tax burden. They muster too large an army, however, to submit indefinitely to unjust impositions in any form.

They believe that city streets and country highways

were designed primarily for vehicular traffic. They are rebelling, for example, at the theory that when they are driving where they belong and run over a farmer's hen which has been strolling in the road they should pay the farmer for his sad bereavement. Highways were not built to serve as henries.

Most regulatory legislation has been based upon the theory that the motorist is always to blame, no matter how careful he may have been. Few drivers begrudge a bicyclist the room required to pedal his wheel provided he sticks to the edge of the road, but it irks them to have the cyclist zig-zag along ahead of them for a mile or more and hold up a long line of traffic.

Playgrounds Needed

Motorists agree that children must have playgrounds and that they must be expected to use the streets if nothing else is available, but they do feel that safer places should be provided. Mighty few of them are going to run down a child at play if they can help it. In 99 cases out of 100 such accidents are not the fault of drivers.

They concede practically unanimously that pedestrians have a perfect right to cross the street, but they feel that crossings should be used for this purpose, and that when traffic is directed by an officer it should be just as grave an offense for a pedestrian to disregard his signals as it is for a motor vehicle driver.

Credit is due the Ohio Legislature because it has taken a rather advanced view of the pedestrian problem in its statute designed to regulate traffic uniformly in all sections of the State. The provisions in this respect are somewhat more definite and more strict than any heretofore adopted to cover an entire State.

Three rules are laid down for pedestrians. First, they are forbidden to walk "in, along, or upon" the part of the highway used by vehicles, except at crossings and crosswalks, unless such crossings or crosswalks are an unreasonable distance apart.

Strict Law Enforcement

This rule applies to all streets, roads and highways which have crosswalks, sidewalks, cinder paths, or other space set aside for pedestrian traffic.

It is obvious that a strict enforcement of this law would alter the traffic problem considerably by reducing greatly the number of chances of accident. The viewpoint of the law, as expressed in this provision, is that certain parts of the highways should be set aside for the two classes of traffic, vehicular and pedestrian, and that neither should encroach upon the rights of the other.

The second provision commands all pedestrians, as well as drivers of vehicles, to "obey and abide by all signals, whistles and directions of police officers."

The third provision is directly related to the personal safety of the pedestrian. It says:

"Pedestrians shall not step into or upon a public road or highway without looking in both directions to see what is approaching."

Pedestrians also have an interest in the speed regulations. In this respect the State code takes precedence over local regulations. It is illegal for a village, for example, to set a lower or higher limit than that specified by the Ohio statute. Here is the law's regulation of speed:

Regulation Outlined

Fifteen miles an hour in the congested, or closely-built up parts of a city, including the business district.

Twenty-five miles an hour outside of a municipal corporation.

Driving at a rate of speed greater than these, the law says, shall be *prima facie* evidence of speeding. There are times, however, when these limits may not be reached without violating the law, for the code further provides as follows:

"It shall be a misdemeanor to operate a motor vehicle at a speed greater than is reasonable and proper, having regard for the width, traffic, use, and the usual rules of that road."

For example, if a narrow street in a residential district were crowded with automobiles and pedestrians, the motorist who would try to plunge through it at 25 miles an hour, thinking that he was within the legal limit, would be likely to find himself arrested. If a charge of speeding could not be sustained, he would be liable to arrest on the charge of reckless driving.

In addition, the faithful observance of this section of the code will work to the same end, for it says, in effect:

"Motor vehicles shall be operated with due regard for

the safety and rights of pedestrians and the drivers of other vehicles. The driver shall not endanger the life, limb, or property of any persons lawfully using the streets."

For violation of any provision except those regulating speed and the prohibition of careless and reckless driving, the penalty is a fine of not more than \$25 for the first offense and from \$25 to \$100 for the second offense.

Under this heading come the following violations: Jay-walking, refusal to obey traffic police signals and commands; failure of drivers to keep a clear view to both sides and to the rear, either by direct view or mirror; non-observance of the right-of-way provisions; failure to give proper signals before changing the course of a motor vehicle; making a turn the wrong way; failing to keep to the right; and the other violations of the rules of the road.

The harshest sentences, however, are provided for violators of the regulations concerning speeding and reckless driving. This should be sufficient answer to the many unjust allegations that the motorist is allowed an unfair advantage over the pedestrian in the use of the streets.

Pedestrian's Rights

There need be little fear that the law will not be generally enforced so far as motor vehicle drivers are concerned, but it is doubtful if enforcement will extend so generally to pedestrians. Whether it is or not, however, it will have one salutary effect. Since a pedestrian's rights in the streets and highways are prescribed down by law, he violates the law at his own risk and no motorist can be held either legally or morally responsible for injury to a pedestrian who has disregarded the provisions of the statute.

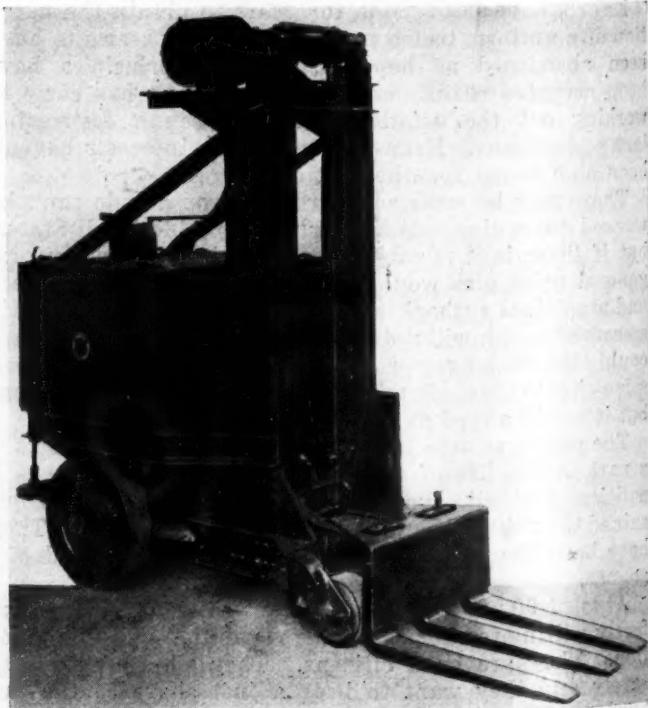
New Type of Tier-Lift Truck Developed

A NEW model tier-lift truck has been placed on the market by The Lakewood Engineering Company. Following the development of the original tier-lift in 1920 there came a demand for the handling of commodities such as sheet tin in shipping from mill to factory. The use of platform skids for carrying the load in the freight car called for so large a number that the investment charges wiped out the savings otherwise effected. Through several stages this led to the development of a modified tier-lift, as shown in the accompanying photograph.

Carries 2500-lb. Loads

This truck can pick up 2000-2500-lb. loads which are placed on 2 x 2-in. strips, thus eliminating the skid investment. The tin is placed on these strips in the car at the mill, and a similar truck unloads the tin at the plant and stacks in 2000-lb. units three high. With a travel of about 125 ft. an operator and a helper can unload a 35-40-ton car of tin in about an hour and a quarter, we are informed.

The application of this unit to other commodities is possible, with the attendant saving of the investment in skids. The driving and lifting mechanism of the truck is standard, and the forged steel forks or arms are placed on the trucks in the way best suited to meet the user's requirements. This gives the truck a wide range of application.



Tier-Lift truck with fork for picking up load

Wider Sale of American Accessories Possible in Spanish Market

European makers control seventy-five per cent of the business at present. Proportion is much lower in certain lines. Tire trade strongly affected by contraband shipments which avoid payment of duties. Spaniards like to add equipment to cars.

By L. H. Schultz

FRENCH accessory makers are getting about 75 per cent of the Spanish trade at the present time. American accessories are having a harder struggle in this market than are passenger cars shipped from the United States. French supremacy in this field is due to a number of factors, chief among which may be listed the following:

1. Proximity of market to France.
2. Depreciated currency.
3. Liberal credit terms.

Low freight rates and packing costs result from the proximity of France to Spain, while depreciation of the franc has made prices even lower than they would be under normal circumstances.

French accessory makers grant liberal credits to Spanish distributors and jobbers, while American manufacturers do business practically on a cash basis.

Excessive retail prices, however, are the greatest barrier to widespread accessories sales of all kinds. Spaniards are eager to buy almost any kind of equipment which adds to the appearance or comfort of their car, but dealers insist on charging prices which are all out of proportion to the wholesale cost. If American companies could find some method of controlling the retail price of their accessories the market for these products could be increased very rapidly.

The accessory business is usually handled separately from car selling, because the Spanish purchaser is inclined to think that he should get a few extras thrown in with everything he buys. Consequently, when he sees various equipment items in the car salesroom, he is likely to demand that some of them be added to the car before he buys it. He would not expect, of course, to pay extra for them.

Jobbers are usually located in Barcelona and Madrid, while some have branches also in Seville and perhaps in the northern section, Bilbao, Santander or San Sebastian. But the majority are satisfied to have the two places first mentioned as distributing points. Shipments are usually on a 30-day payment basis, but are shipped also on consignment. In the larger cities one finds many stores handling accessories and tires only and charging excessive prices for the former products.

American makers have been successful in securing the greater part of the market in some lines, notwithstanding French domination in general. These lines include storage batteries, spark plugs, piston rings, non-skid chains and electric horns.

In these lines American makers are getting from 55 to 75 per cent of the business.

European carburetors hold the Spanish market almost in its entirety, the French-made Zenith holding the

strongest position. It controls about 60 per cent of the business, as against 10 per cent for the British Solex, 5 per cent for the French Claudel, and 15 per cent for the Spanish Irz. The last make is original equipment on the Hispano-Suiza and is gaining in popularity because it is an efficient national product. The remaining 10 per cent of the market comprises various other makes, including a few American. Replacement of American carburetors by a European one is not uncommon.

The adjustability of the American carburetor is not appreciated, while the French products are favored because of low fuel consumption, especially for city travel.

American spark plugs are losing some of the market which they gained during the war. Bosch has re-entered the field and is attempting to regain its pre-war popularity through extensive advertising.

In the storage battery field American makers are doing very well. They control about 80 per cent of the total business. American batteries are used as original equipment on Hispano-Suiza, Espana, Mathis, Victoria and Elizade. The Tudor battery, a Spanish product, has about 10 per cent of the trade.

Most cars on the Spanish market are arriving equipped with both battery and magneto, but no American magnetos are for sale in Spain.

American piston rings are supreme, securing from 40 to 60 per cent of the trade at fair prices varying from 4 to 6 pesetas. A Belgian make follows, while French and British products are also getting some trade. About a dozen makes and grades are on the market.

The electric horn market is somewhat limited by the fact that American cars carry them as equipment. Business is divided between American and French makes, each getting about 35 per cent, although the American horns are higher in price. British and Germans take the rest of the market.

Demand for Electric Horns

There is, however, a large demand for hand-horns, nearly every car having one, whether equipped with an electric one or not. The French predominate, with their carnival sounding horns, which sell as low as 10 and 25 pesetas. These horns are used constantly by both motorcycles and cars. German and French horns both are offered at about 33 per cent of the price of American hand makes.

French hand tire pumps are being offered at 12 to 35 pesetas and are supreme in the market against American, British and German competition, the latter lines being too high in price. A light and low-priced electric pump would find a ready sale.

American spotlights dominate the market. Almost every car uses them. They are being sold at 50 to 250 pesetas. Some cars, however, have auxiliary lamps as large as a headlight, placed on the windshield, the fender, or even on the front of the car between the headlights. These lamps are presumably German makes.

British nickel-plated tonneau windshields are preferred to American wood-framed makes. French makes also sell, both these and the British being offered at 200 to 300 pesetas. American non-skid chains are predominant and are being used more widely each day. The market possibilities are by no means exhausted, as the Spanish driver is just beginning to appreciate the benefit derived from chains. German tool kits are being offered at 15 pesetas for Fords and up to 50 for larger cars. Electric and automatic windshield wipers or cleaners are finding a developing market.

Bumpers are being used to some extent in Spain, but the market awaits its biggest development in the hands of capable houses. The appearance of bumpers on stock cars of American origin at the present time will do much to aid in the introduction of this product. Careless driving and narrow streets would seem to make their use imperative, even though traffic is not so heavy.

Shock Absorbers Needed

Shock absorbers are being used to about the same extent as bumpers, and with the cobbled streets their distribution should increase. Such products, however, are just being accepted by the Spanish motorist and their sale should increase steadily with judicious advertising.

Spaniards prefer to remove the entire wheel when a tire has gone bad rather than to change rims. If American makers of wire and disk wheels desire to make sales they will have to change their product to meet this preference in case it does not do so at the present time. European makes are selling above American at present for this reason. Chauffeurs have a good deal to say in the purchase of accessories as well as cars and, as they remove the wheels, they are beginning to show a preference for the demountable wheel.

The Spanish market for modern and efficient garage equipment is in its infancy. American manufacturers can secure the greater part of it if they take great care in selecting an active and capable agent. Free air, or even air for a charge, can be secured only at a few places in the country. The dealer is always glad to send a boy out with a pump and tire gage to fix up the customers' tires, but the time consumed is far too long for efficient service. The oil stations, which number some 400 or 500 in the entire country, strangely do not offer anything but gas and oil and, sometimes, water.

The high cost of tire inflation equipment is given as the principal reason for its absence. Good advertising illustrating other uses for compressed air, would undoubtedly assist sales by showing that the unit can be put to work in many ways.

Tire "Bootlegging" Is an Evil

Tire "bootlegging" is causing trouble in the Spanish market. Keen competition for business exists between Michelin, which has gained great popularity, and various other makes of tires, some of which are prominent American brands. This competition has resulted in considerable price cutting.

The situation has been complicated by the smuggling into Spain of many carloads of French tires. By avoiding the payment of tariff duties, dealers receiving these tires have been able to sell them at a price far below that which would yield any profit to merchants obtaining their goods through legitimate channels.

This condition will probably be cleared up soon, however, as a new ruling went into effect on Aug. 1, requiring every tire coming into the country to be sealed with a certain seal at the cost of the importer. This will make it possible to recognize contraband goods. While the new requirement will mean delay and added expense to the importer it should benefit him materially by eliminating "bootleg" competition.

Dealer Stocks Are Low

Many evils still exist in Spanish tire merchandising, the greatest of which is the custom of the dealer of ordering stocks only as sales are made. Many dealers refuse to take the chance of losing money on fluctuating exchange. They order a tire from the branch, if they are in a branch city, for delivery in the afternoon when the order is placed by the customer in the morning. Even though exchange is fairly stable at present this practice holds over from the days when it was fluctuating widely and when many dealers lost money on large stocks. Dealers in outlying towns have one or two tires of each kind in stock and immediately on sale of one tire order another to replace it.

Tires are sold on thirty days' credit as a rule and also on consignment. The tire companies have salesmen who travel the territory, and although they try to get around every month to check up dealers working on a consignment basis, they are sometimes unable to make their rounds more than every two or three months. Dealers, therefore, do not report sales as often as they should. Many secure 90 days' credit in this way and finance themselves at the cost of the tire company. It is difficult to say how this matter can be cleared up without doubling the number of salesmen and thereby raising overhead expenses, as the salesmen are in reality but stock checkers.

Tire agents are found in every town which has a reasonable number of cars. In the larger cities there are no restrictions as to the number of dealers. The various branches find themselves unable to change present business methods individually, especially with competition so strong, but with a working agreement of some kind, after the various manufacturers have finished their cut-throat competition, it would seem that something might be done to recognize retail and distribution methods. The automobile importers' association is also dissatisfied with present tire selling methods and may be able to help the tire distributors if they so wish.

Retail Prices Too High

The chief difficulty in the accessory and garage equipment situation is too great profits for the Spanish wholesaler and retailer. Were it possible for an American house, handling a complete line of these products, to enter the country with a branch house or some controlled agency, the resulting market would well be worth the effort. The country is now at the modern stage of automotive development and competition will bring a need for the best of service and convenience to all customers.

Once the commercial treaty is renewed American companies with a proper study of conditions and cooperation in assisting their agents to adopt such better merchandising methods as are possible will find themselves supreme in the market in all lines, notwithstanding the ability of some European countries to undersell at present under conditions which are familiar to everyone.

Retail prices must be reduced or a greater volume of sales will not be possible. If an agent cannot be made to see this well-known American principle, it will be hoover the house having a complete line to enter the market, as the business will be well worth while.

Average Life of Automobile Increases to 6.7 Years

Accurate calculations impossible with data available at the present time. General indication of trend can be obtained. Analysis made two years ago indicated each car was used for 5.3 years before being scrapped. Various factors cause change.

By P. M. Heldt

WHEN motor vehicle manufacturers are able to determine with any degree of accuracy the backlog of replacement business upon which they can depend, they will be able to do many things which are now impossible. They know pretty definitely the percentage of the total business they can expect to get, and if they could forecast somewhat definitely the extent of the replacement demand they could make commitments a considerable period ahead for a minimum supply of materials and thus take advantage of market fluctuations.

There has been no lack of replacement estimates, based on sundry hypotheses. The figures look impressive, but they don't prove, and relatively little reliance can be placed on them. Statistics which won't hold water make a mighty wobbly foundation upon which to build production schedules.

The industry is gradually building up a considerable volume of fairly reliable statistics on various subjects related to passenger car production, although the truck still offers an almost virgin field for exploration. It is certain that sooner or later some fairly accurate data on replacement demand will be assembled and all efforts in that direction are highly commendable. It should be understood, however, that too much reliance should not be placed on them until experience has demonstrated their value.

Volume of replacement business depends upon the average life of motor vehicles. If the wearing qualities of automobiles were exactly alike, year in and year out, there would be little difficulty in working out an exact answer. But many factors must be taken into consideration. There is considerable variation from year to year in the models made by any company. It can't be avoided. Much depends also upon the owners. One who gives his car the best of care will make it last much longer than one who doesn't.

With a full knowledge of the difficulties involved and understanding clearly that no statistics which it is possible to work out at present will be entirely reliable, the editor of AUTOMOTIVE INDUSTRIES asked P. M. Heldt, who has one of the best analytical minds in the industry, to estimate the average life of the cars now being built and to estimate the number retired each year since 1911.

We believe that Heldt's analysis, which follows, is at least much more accurate than many which have been made in the past:

Two years ago figures were published tending to show that the average life of automobiles was about 5.33 years. A compilation just completed shows the life to be 6.73 years. This figure was obtained from statistics of an-

nual production of cars and trucks, the yearly registrations in all of the States, and the number of cars imported and exported each year.

The accuracy of the figures arrived at for the average life of the cars depends, of course, upon the accuracy of the different sets of figures on which it is based. Undoubtedly the figures of production, exports and imports are quite reliable, and the only set of figures whose accuracy probably is not all that might be desired is that of registrations. These figures, in the first place, have to be obtained from some fifty different sources, each of which involves chances of error. However, these figures have now been compiled for a good many years by a number of agencies and great care is being used in making allowances for possible errors. Hence these statistics also may be regarded as fairly accurate.

When the former figure on the average life of motor vehicles was published, perhaps not enough emphasis was placed on the fact that it was not the average life of the cars then being manufactured, but of those which had already completed their period of usefulness, whose date of manufacture lay back from 6 to 13 years. It applied to cars which were manufactured from the latter part of 1908 to the latter part of 1915.

During this period a number of important changes of design were introduced which had a tendency to render automobiles not embodying these new features obsolete. Among the features referred to are the four-door body, the streamline type of body without offset at the dash, the electric starting and lighting system, etc.

Character of Fuel Changed

In addition, the character of the fuel sold for automobile use changed greatly during this period, making it almost impossible toward the end of the period, with a car manufactured early in the period, to start it in winter time. It was, of course, possible to adapt the old cars to the new conditions, but this involved a great deal of expense and many owners did not consider the old cars worth it. Certain features, such as the four doors and sloping dash and windshield, came into almost general use at a certain period, so that any car which did not have these features could readily be recognized as belonging to an earlier period, and this hastened their retirement.

There have been no equally striking developments in body design nor equally important changes in mechanical features since 1912, and it was therefore to be expected that if the same analysis was applied to cars manufactured since that period it would show a longer life. Quite conceivably other developments, such as the

improvement of our roads, the multiplication of repair-shops, the introduction of the flat-rate system of car repairing, and the general education of automobile drivers also have tended to increase the average life of cars. Before entering into the analysis it may be well to again emphasize the fact that the result arrived at applies to cars that were manufactured from 1912 to 1915, and not to cars of recent manufacture. It has the advantage that it is based on the actual performance of these cars and is in no way an estimate. What the life of cars of this year's manufacture may be we can know only when they are worn out.

Basis of Figures Given

In the accompanying table the second column gives the number of cars registered in the United States up to the end of the respective years. These figures, by the way, are taken from the pamphlet, Facts and Figures of the Automobile Industry, published by the National Automobile Chamber of Commerce, to which we are indebted also for the figures of production, given in the third column. The fourth and fifth columns show the numbers of cars exported from and imported into this country respectively, as obtained from the Foreign Commerce Reports. The figures in the sixth column, headed "Cars Placed in Service," are obtained by adding to the number of cars manufactured in any one year the number of cars imported that year and then subtracting the number of cars exported. Finally, the figures in the seventh column, headed "Cars Retired," were obtained by adding to the number of cars registered up to the end of that year the number placed in service the following year and then subtracting the number registered to the end of the following year. The reasoning on which this procedure is based is that if all of the cars which were registered in any one year remained in service the next year, then the registrations at the end of the next year would be equal to the registrations at the end of the first year plus the number of cars placed into service in the course of the second year. If the number of cars registered at the end of the second year is smaller than this sum, the difference must be the number of cars that were registered the first year but were not re-registered the second year; in other words, those that were retired.

There are undoubtedly a great many old cars in existence that are in such a state that they could be operated if their owners had any special incentive to keep

them in commission. For instance, if for any reason the price of new cars should increase materially while the general prosperity of the country did not increase correspondingly, many owners who would otherwise have been good prospects for new cars would decide to keep the old machine running another year. For this reason it is undoubtedly true that the useful life of cars varies inversely as the business cycle. If these factors, that is, the relative price level of new cars and the prosperity of the country in general, did not enter into the problem, we might expect the number of cars which are discarded to increase gradually from year to year in about the same proportion as production increased from year to year some six or seven years earlier. In reality the figures of cars discarded show a much less regular progression than the figures of annual production. In 1917, for instance, the number of cars retired was exceedingly low, while right after the war it became unusually high. In order to eliminate the effects of the swing of the business cycle and other extraneous factors we have to base our calculations on the production and retirements of periods covering several years.

Period Deferred

During the four-year period 1918 to 1921, inclusive, there were retired 2,038,619 cars. During the four-year period 1912-1915, inclusive, there were placed in service 2,186,217, and during the four-year period 1911-1914 there were placed in service 1,552,501 cars. Hence the four-year period during which the cars that were discarded or scrapped during the period 1918-1921 originated lies somewhere between the 1911-1914 and 1912-1915 periods, but closer to the latter. By interpolation we find that the period began when 1911 was 76.6 per cent over. If the number of cars placed into service during the 1912-1915 period had been exactly equal to the number retired during the 1918-1921 period, then each car would have been registered seven times, but as it is, the average registrations were 7.234. This would indicate an average life of 7.234 years, but inasmuch as each car is registered during the year it is placed in service and also during the year it is retired, but hardly any of the cars are in service for the full year in either case, it is well to subtract about one-half year from this value.

Therefore, the average life of the cars that were manufactured and placed in service in this country from the fall of 1911 to the fall of 1915 was 6.73 years.

Registrations	Number of Cars Produced	Cars Exported	Cars Imported	Placed in Service	Retired
1911.....	637,514	.....	.....	195,165	50,662
1912.....	944,000	378,000	23,720	355,148	115,603
1913.....	1,287,000	485,000	26,889	458,603	119,246
1914.....	1,711,339	569,054	25,765	543,585	94,556
1915.....	2,445,664	892,618	63,958	828,881	436,871
1916.....	3,512,996	1,583,617	80,843	1,504,203	197,469
1917.....	5,104,321	1,868,949	80,235	1,788,794	64,171
1918.....	6,146,617	1,153,638	47,244	1,106,467	507,895
1919.....	7,530,105	1,974,016	182,750	1,891,383	387,455
1920.....	9,177,129	2,205,197	171,644	2,034,479	337,102
1921.....	10,464,005	1,661,550	38,094	1,623,978	806,167
1922.....	12,239,114	2,659,064	78,234	2,581,276	.....

Stable Employment Benefits Industry

Responsibility rests
on manufacturers; some
plans already in use

THE employment guarantee recently given by Procter & Gamble Soap Co. comes to the attention of the Planet Motor Car Co. executives and causes some disagreement as to its feasibility and application in the automotive industry.

By Harry Tipper

"I SEE they're having another troublesome time in England over the unemployment insurance. That seems to be one of the Lloyd George policies left over from the war that it has been difficult to bring back to normal." Frank Lane, treasurer of the Planet Motor Car Co., was interested in international matters, because of his personal acquaintance with European affairs, and he frequently started a discussion at the lunch table with a reference to such items.

"It does seem ridiculous that we cannot keep men at work in the reasonable security of a steady job, with all the demand for products and all the necessity for good workers," he continued.

"I am inclined to think that I am an exception to the general rule, or the accepted idea of the rule that men grow more conservative as they grow older. I think I am becoming more radical in some things. As I become more comfortable myself and observe what has happened to the stockholders and owners of this corporation I am less inclined to absolve industry from the entire responsibility to the worker for the reasonable continuance of his work. In fact, I am inclined to say that 'industry must recognize that responsibility.'"

"I see Frank is off on his lectures again," Jim Chance remarked, who sat down to try to catch the last sentence or two of the conversation.

"Of course, I don't agree with you a bit, Frank. Why should we insure the worker against unemployment? We can't govern what the public will do in the way of paying; we can't get rid of our product when it isn't wanted, and we can't employ a lot of men when there is no work to do."

"It's all nonsense, and I don't like to see you thinking about such matters. It's unsettling."

Independent Thinking

Frank Lane smiled; in some respects he was a very independent thinker, and no one had ever accused him of any timidity in his thinking.

"I must admit," he said, "that I had the cards stacked against you a little, Jim. I opened this conversation from a practical matter that came up which John and I were discussing before you sat down. I was really waiting for you to say it can't be done, because we were just reading over some information about a prominent business concern in this country which is doing that very thing."

"Have they arranged for the receiver, Frank, or otherwise put their affairs in such shape that the inquest can be duly illuminating as to the cause of death? You don't appear to be stumping me, and I suppose there are

all kinds of business even as there are all kinds of people. The reckless driver is no excuse for my taking chances."

"That's an easy way to dismiss the subject, Jim," John Carter, vice-president in charge of production, broke in, "but it doesn't solve the problem for me at all. You don't have to dismiss your organization and reduce it every so often. If an office employee leaves or is fired it is an individual case. Once in a long while you have to slash the force. It has happened twice in my recollection of the Planet Motor Car Co., and when you did your wails about the trouble of training and rebuilding could be heard all over the city."

Employment Fluctuating

"On the other hand, I'm never done. It is useless to talk to the worker about loyalty, efficiency and all that sort of thing when the number of men employed is constantly fluctuating. It is ridiculous to suppose that the men are going to recognize any particular obligation to the company when they know the job is good only as long as there are orders on the books. How do you suppose I can control the men when they see that we can't control our own business? So I am always deeply interested in anything which will suggest ways and means of developing a greater security of organization."

"Isn't it part of your job, John, to deal with organizations of a fluctuating character? That's one of the phases of the manufacturing business you must take into account." President Billings had not spoken before and this question was a favorite way of breaking in.

"Yes, it's a part of my job, just as the waste in any other sense is a part of my work. It's a difficulty to be put up with until it can be overcome, and not a moment longer than that."

"I am glad we did not increase our facilities during the peak of 1920 as much as appearances suggested, or my difficulties in that direction would be greatly increased. But I can't accept the idea that nothing can be done about it. If I do that, it will not be improved and will only get worse. So when Frank showed me that clipping from the newspaper, announcing a plan which Procter & Gamble were putting into effect I was interested immediately, and the sequel to it is much more so."

"Procter & Gamble! They are the big soap people?" queried James Chance. "Do you mean to tell me they have guaranteed their employees against unemployment? Those in the factories, as well?"

"Yes," said Frank Lane; "that's exactly what they have done. I noticed an item in the newspaper about

the matter. I showed it to John, thinking he might be interested, and we sent out there to get the particulars. We were just about reading the reply when you got here.

"The plan itself appears to be very simple. Evidently the published outline was gotten up without a lawyer and the guarantee appears to be full and complete. The first paragraph guarantees to all employees at the Ivorydale Factory who are participating in the Profit Sharing Plan of the company forty-eight weeks of work in each calendar year, less time lost for holidays, fire, flood, strike, etc., confined to extreme exigencies. That is a pretty definite statement, particularly as the Profit Sharing Plan has been going a good many years and almost all the employees are participants in it."

Reserves Right of Discharge

"The company reserves the right of discharge, the right of transfer, and the right to terminate the agreement on six months' notice."

"Let me see that paper," James Chance requested. "The cards were stacked a little, I admit. Of course, the conditions in the soap business are entirely different from ours, for instance, and the matter is of no interest beyond the fact that it is in practice. Still I don't see how it can work out in any business. All lines of business suffer under variations in demand and it must be a matter of great expense to attempt stable production under those circumstances."

"Here's the plan. Doesn't cover much paper, does it? And the language is too simple to include any jokes. But the most interesting document is the letter." Frank Lane went on: "There are four particularly interesting elements in the letter to me. The statement in the first paragraph about the daily consumption, the control of distribution they have secured through the cooperation of the dealer, the fact that they were operating the plan for two and a half years before they announced it as a fact, and the fundamental needs of industrial organization as outlined by Rowntree, the English manufacturer."

"Go ahead and read it, Frank; it will be interesting, anyway," suggested President Billings. "Evidently the plan is a going matter, not a hope, so there must have been some practical thinking in it."

"All right," agreed Lane. "Here it is:

"Our business is one of manufacturing and selling, under different brands, a household necessity of daily and regular consumption. Speaking generally, we do not believe there is much variation in the daily consumption of our products by the ultimate consumer. This being so, theoretically, our daily production should equal the daily consumption, all the variations in the demands made upon us being due to the varying size of the stocks of our goods carried by the distributors and dealers between us and the ultimate consumer. From our knowledge of our own industry and business we estimate our probable sales for the next six months, and base our daily production upon such estimate. By the middle of each month we schedule for the following month the different brands to be produced, correcting any error due to the estimate of the preceding month."

"There are, of course, wide differences between the daily or monthly orders received and our daily or monthly production. These differences are taken care of—

1st—By adequate warehouse facilities.

2nd—By controlling our deliveries to the dealer so as to maintain his stock upon an approximately normal basis.

The dealer is quite ready to cooperate with us in doing this. His order is received and entered for whatever quantity he desires to buy and we to sell, but his deliveries and payments upon that order are made as his trade demands the goods, and he, of course, is saved the investment and storage of unnecessary stocks.

Before announcing the present plan we tried the system out for a period of 2½ years, and have had no difficulty in maintaining regular operations. The character of the business requires a two weeks' shutdown a year to overhaul the plant. With these exceptions our plants have been in continuous operation since the system was adopted.

I do not think there is anything peculiar in the soap business that makes such a plan more adaptable to it than to many other industries. I believe that in the very great majority of industries the average annual consumption is the same, without much fluctuation from year to year, and that the problem of providing for the distribution and warehousing is not a difficult one to work out if study is centered upon the special industry. I believe, from the economic side, the plan is sound. With proper knowledge of the business, shutdowns should be so exceptional that the corporation could well afford to pay its wage earners during such period. The advantage of a regular production and a satisfied and permanent force of workers would easily more than offset such possible shutdown expenditures.

We are very glad to be able to put this system into effect in our corporation. We have believed, and we think we have demonstrated, that it is possible under present economic and industrial conditions to so organize the business as to satisfy all proper wants and aspirations of its workers.

Mr. Rowntree has well defined the needs of industrial organization as follows:

1st—Industry must so organize that it will become possible to pay all workers of normal ability wages which will at least enable them to live in reasonable comfort.

2nd—Their working hours must be such as will give them adequate opportunities for recreation and self expression.

3rd—The workers must have a share in determining the conditions under which they shall work.

4th—They must have a direct interest in the prosperity of the industry in which they are engaged; and finally

5th—Measures must be taken materially to increase their economic security, notably with regard to unemployment.

Principles Fulfilled

I think we can claim that all conditions covered by Mr. Rowntree in the above statement have been met by The Procter & Gamble Company. The first four mentioned by him have long been in effect in the company, i. e.:

1st—We have not only always paid slightly in excess of the prevailing scale of wages, but have also provided sick benefit, old age pension and life insurance.

2nd—We have been operating for fifty years under a fifty hour per week schedule.

3rd—We have for years had a conference committee before which all matters concerning working conditions are brought up for discussion.

4th—Since 1887 we have had a profit-sharing system in effect, through which the employees share in the prosperity of the company.

5th—We are now undertaking what I personally believe is the most important, viz., protecting the economic security through providing against unemployment.

Finally, I can say, so far as this company is concerned, I believe that all these conditions of employ-

ment have been inaugurated and maintained without cost to the company, although it may not be possible to show on paper the exact financial return. The regularity of operation with contented and loyal employees has an economic value hard to define.

"While the above statement as to the value of the company of conducting its operations in the manner it does is beyond question, I have no doubt that none of them, separately or all of them combined, would pay if inaugurated by a corporation for the purpose of making profit out of them rather than the higher motive of right dealing with its workers."

"Of course, that may be all right in the soap business, as I remarked before," commented Chance, "but what are you going to do about daily, weekly or monthly consumption of an affair like an automobile. I don't see much in that to interest you, John."

"You're right, Jom, to a considerable extent, but I don't know that it is wise to assume that there is no application. For instance, why should we have a lot more men to keep abreast of deliveries in the more rapid selling season and then lay off a lot of these fellows

later on? Isn't it possible that we could produce somewhat in advance, and arrange deliveries in a more regular way? At any rate, it is a matter for some consideration."

"Of course, that letter is all wrong in the statement that in a great majority of industries the average annual consumption is the same," said President Billings. "Per capita consumption is probably on a pretty stable basis in soap, collars, meats and a lot of things of regular and general necessity to the individual, but in many other lines—machine tools, raw materials, implements, automobiles—there must be a considerable fluctuating in the amount over any period in comparison with another."

"Well, what do you think of Rowntree's statements of needs?" asked Frank Lane.

"I am inclined to think they are correct as practical, ideal objectives; beyond that, only careful study of ways and means can indicate their application, to us, for instance. I will say, however, that I admire Procter & Gamble for making out that plan and I believe that the men who solve the human relations matters for their own organization are doing the biggest work for the future of their own industry."

Protectomotor Air Cleaner Is Filter Type

A NEW air cleaner of the filtering type has been developed by the Staynew Filter Corp and is illustrated herewith. It comprises a sheet aluminum housing with louvres in vertical rows, within which is arranged the filter proper. The latter consists of a framework of steel wire cloth covered with one piece of specially prepared felt. The framework with its felt covering is in the form of a hollow cylinder with longitudinal radial fins. The louvres in the housing are located between these fins, and air drawn in through the louvres has to pass through the filtering medium into the interior of the fins and thence into the hollow cylinder from which connection is made to the carburetor through a flexible metal hose.

The effective area of the air passages through the felt is said to be two hundred times the area of the carburetor intake, hence the velocity of the air through the filter is only one two-hundredth that of the velocity in the carburetor intake. This low velocity of the air causes the sand and dust to be separated out mostly by gravity and to fall to the bottom of the cleaner, which is perforated to make the device self-cleaning. As may be seen from the illustration, the air enters the cleaner

parallel to the surface of the felt and this is claimed to cause it to adhere very lightly to the felt and thus to remain porous, so that the air can readily pass through even though a good deal of dust may have accumulated.

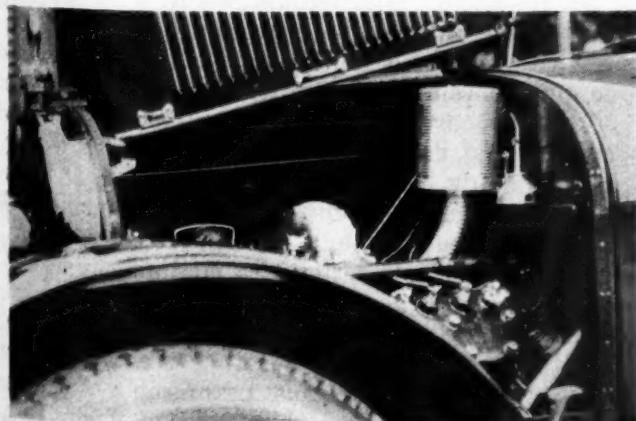
It is recommended that the filter be mounted on the forward side of the dash, as high up as possible. The warm air from the engine will then enter it and the need for an air stove is obviated, it is claimed. This method of installation delivers air at a fairly uniform temperature to the carburetor.

Universal Gear-Testing Machine

A UNIVERSAL gear-testing machine has been developed in the National Physical Laboratory of England and was exhibited at a recent Conversazione of the Institution of Civil Engineers. It can be used both for inspecting individual gears, such as spur and helical, straight and spiral bevel, and worm gear, and for measuring the errors in the running of trains of gears. The machine is capable of taking gears up to 16-in. diameter. It can be used for determining pitch errors, lack of alignment of the teeth with the gear axis, tooth profile errors and eccentricity.

The profiles of all of the teeth may be traced in a group on an enlarged scale, those of adjacent teeth being spaced only a few thousandths of an inch, which permits of observing at a glance any errors in profile and in concentricity. In the case of helical gears the pitch angle can be measured and variations from the true helix determined. In the case of bevel gears any errors in uniformity of tooth taper and want of intersection of the center line of the tooth with the pitch cone axis can be determined.

Finally, any inaccuracies of motion of a pair of gears can be determined from a polar diagram traced. As may be imagined, the machine is quite complicated, and it does not seem to be the intention of manufacturing it, but the National Physical Laboratory makes tests on it for industrial firms.



Protectomotor installed on passenger car

AUTOMOTIVE INDUSTRIES

AUTOMOBILE

Reg. U. S. Pat. Off.

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Would Prohibit Spray Painting

VARIOUS painters' union organizations in certain States have succeeded in having introduced into State Legislatures bills which in effect prohibit the use of so called "air brushes" or spray painting methods. Since this method of painting is much more rapid for some kinds of work than ordinary hand brush application and since it is already widely used in the automotive industry and bids fair to be much more generally used in the future, it is of considerable importance to the industry to see that such bills are defeated as they deserve to be, should they again be introduced in future legislative sessions.

Since the days of the first railroad organized labor has often taken the attitude of opposing the use of labor-saving devices and other inventions of similar character, although such developments have in the end almost invariably led to a wider rather than a diminished demand for labor. Enlightened labor leaders recognize this fact, but there are, unfortunately, still many so-called leaders of the other variety against whom society must protect itself if

healthy industrial progress is to continue.

So long as we have special interests seeking for purely selfish gain through class legislation, it will doubtless be necessary to watch the legislatures to prevent unfair laws. The automotive industry must do its share of the watching, but in so doing must take care that it is not itself unfair in considering the just demands either of organized labor or of the public in general.

Efficient methods of producing and building work to the advantage of everyone concerned over a long period of time, even though they may seem to be temporarily unfavorable to certain interests. Consequently, the best process is bound to be used in the end.

Make Buses Easier Riding

FEW persons who have given the matter of bus design or sale any study worthy of the name will deny that easy riding is a highly desirable characteristic, yet it is seldom indeed that the traveler finds a bus which can be truly described as a comfortable vehicle.

It is, of course, easy to excuse present shortcomings in riding qualities, but this doesn't make existing buses any more comfortable for the passenger. The time was when passenger cars were far from being comfortable conveyances, and there are still many cars which are much harder riding than need be, but the average car of today is greatly superior in riding qualities to that of a decade ago. The bus can be correspondingly improved by following precisely similar methods.

To begin with, it can be comfortably upholstered, or at least fitted with seats which approximately conform to the average human anatomy. Narrow side seats, with backs which are little more than boards forming a part of vibrating body sides, are a particular and frequently found abomination. Seat cushions and backs which approximate in riding qualities even those of the cheapest passenger cars are seldom used in buses, while a really well-upholstered bus seat is rare. Higher upkeep and first cost of well-upholstered seats are not to be overlooked, but are not insurmountable difficulties.

In the second place, better springing of the chassis is certainly possible. The problem is a difficult one, but not insoluble. Approximations to a satisfactory solution have already been worked out along passenger car lines and much better ones are believed to be quite possible. They are certainly worth a lot of effort to secure. Supplementary devices intended to cushion and damp out vibration are also worthy of careful study. Possibly even some form of pneumatic cushion, either at the seat or at the spring, will yet be found practicable.

In the third place, better tire equipment is available than that frequently used. Pneumatic tires for large buses admittedly have some disadvantages, but it is, after all, a question whether the higher cost and other drawbacks are not permissible when the better riding qualities are considered. In any case, cushion tires are better than solids, except perhaps in

the relatively few cases where the entire route is over smooth and well-paved streets.

Lastly, the various elements which cause vibration and shock, such as poorly balanced engines, badly fitted gears, rough clutches and chattering brakes, should be designed to avoid these faults so far as possible. Doubtless a six-cylinder engine is warranted in some cases, and it should certainly be possible to so insulate the engine from the frame and body as to prevent most of the vibration from reaching the passenger.

Rough riding is not likely to kill the bus business, but it will surely hamper its growth. Conversely, easy riding qualities will stimulate bus traffic and bus sales. They cannot be acquired without a lot of effort and expense, but their attainment will be well worth their cost to the manufacturer who makes the most of his opportunities.

Stresses on Front End Drives

FAILURES of front-end drives of automobile engines are to some extent due to the tendency to use materials with good non-sonorous properties rather than those with first-class mechanical qualities. At the same time, if the stresses to which the cam-shaft drive gear is subjected in service lent themselves to accurate calculation, it would be possible to give the gears the proper dimensions to enable them to stand up in service without making them unnecessarily heavy and expensive.

The above reflections are prompted by a perusal of a report recently issued by the Engineering Division of the Air Service, containing a mathematical analysis of the cause of failure of the camshaft driving gears on an aircraft engine during its endurance test. The stresses in the teeth of the defective gears were calculated by four different methods, and in order to prove that they were abnormally high the calculations were carried through also for the same gears on the Liberty aircraft engines, the result arrived at being that the stresses in the defective gears exceeded those in the corresponding Liberty engine gears by up to 87 per cent. In calculating the stresses in the gears, all of the apparent causes of stress were taken into account, such as inertia of valve reciprocating parts, valve spring pressure and exhaust gas pressure, but it is concluded that the calculated stresses are not those under which the gears failed, as they are much too low to produce failure in the material used.

It is also shown that the methods for determining the wear on gear teeth by calculating the compressive stresses on the contact surfaces do not apply in this case, which, of course, was to be expected, as these methods are intended to give the rate of surface wear, and if a gear fails within the first fifty hours of operation it is fairly evident that it did not wear out, but broke.

The methods of calculation used should give a fairly accurate idea of the stresses in the gear teeth for the case of uniform rotative speed of the driving shaft, but we know that a pinion mounted on a long, multi-

throw crankshaft, at the end opposite the load, does not run at uniform velocity but is affected by the torsional vibration of the crankshaft. The stiffer the crankshaft the less the stress in the camshaft gearing, other conditions being equal.

Automobile designers are not under the same necessity of closely calculating the stresses in various parts as are aircraft engine designers, as minimum weight is not such an urgent requirement and a somewhat higher factor of safety can be allowed, yet it would be very desirable from the standpoint of automobile engine design also if the stresses in front-end gears could be calculated more closely than is actually the case. Even if it were impossible to calculate the absolute stresses, an empirical formula taking account of the torsional flexibility of the crankshaft and the torsional vibration resulting therefrom would help.

Even Open Cars Need Better Ventilation

SOME recent trips in low and medium-priced open cars have brought home the fact that our editorial comments concerning the need for better ventilation of closed cars might well be extended to include also many cars with open bodies. This is especially true of the driver's compartment, which in warm weather often becomes insufferably hot below the level of the cowl.

The overhead cowl ventilator helps matters in some cases, but it is often of inadequate size while the air which enters it frequently ventilates only the upper part of the space under the cowl, whereas it should reach the toe and foot boards. Side ventilators are used to advantage in some cases but are seldom seen on any but the more expensive cars, although they are not in themselves expensive. Windshields which are quickly and easily adjusted to facilitate ventilation are obviously desirable, but too seldom are well designed in these respects.

In some cases much air which has been heated by passage through the radiator and over the engine enters the driver's compartment. This may be a good thing in cold weather, but it is certainly a serious fault when the weather is hot.

Another place where ventilation is often inadequate is in the space under the hood. This is due, in general, to failure to realize that no more air can enter the engine compartment than can pass out through whatever vents are provided. The latter are frequently so small as to seriously impair the efficiency of the radiator and require more radiating surface than would otherwise be needed. Louvres in the hood and undershirts often can be used to advantage or enlarged in such cases.

In general it appears that far too little study has been given to the matter of air flow in and about the car. Even a few hours of investigation along this line would often yield handsome returns in the way of better performance of the car and greater satisfaction on the part of the user with negligible expense to the manufacturer. Cars in general need to be better cooled in summer and better heated in winter.

New Models Further Car Buying Interest

Serve as Strong Influence in Keeping Sales at Exceptional Level This Month

NEW YORK, Aug. 20—The introduction of new models this month has had a marked influence in keeping sales at an unusually high level. Although purchases have not been made in the volume of earlier months they have not shown any pronounced slackening.

That buying interest in automobiles has not weakened is indicated by the reception accorded the new models, which shows at the same time that many prospects have been holding back pending their announcement. The full stride in purchasing, however, is not expected to come this month nor is it likely to be approached until the middle of September.

Producers have availed themselves of the comparative lull by readjusting their manufacturing facilities and getting in readiness for the resumption of high schedules with the opening of the fall season. Through the promises held out for active selling during the remaining months of the year many manufacturers have made extensive additions to their plants which will provide greater capacity. Intensive selling efforts are expected to take care of the output which in the case of the major car builders will continue to be large.

Demand to Govern Output

As in the past, actual conditions in the field will be the governing factor in formulating production schedules. Programs are being stepped up gradually, with the likelihood that the aggregate output for August will be in excess of the 318,000 cars and trucks recorded in July. Reports indicate that the industry is following the pace set the last week of that month, which showed a decided improvement over the earlier weeks.

Parts makers are reporting somewhat longer commitments, thus reflecting the encouraging outlook presented for car and truck sales. There has been a lull in this branch of the industry, with resultant plant readjustments, but business has been maintained at an entirely satisfactory point. Collections continue good, a condition that has prevailed for months, almost without interruption.

Business in Brief

NEW YORK, Aug. 22—A slight improvement in general conditions is noted, following the quietest week of the year. There has been a definite enlargement of trade activity, and prices of commodities have been on the upward trend. Buying of cotton goods in the large Eastern markets has been stimulated by the stronger tone of raw cotton. Raw wool, however, is dull. Considerable activity is reported in jewelry and shoes, while farm produce, led by wheat and live stock, has been generally higher.

Industrially the coal situation is in the public eye, and because of the threatening anthracite strike, the soft coal and coke industry is stronger. The steel situation is promising, and new buying of steel has increased. Demand is better, the railroads being in the market for rails for delivery next year.

The influence of the automobile industry is being felt, and it is reported that automobile makers are buying liberally. With the situation as it is, steel interests are operating at from 80 to 90 per cent of their capacity.

The European situation apparently has had no effect on the stock market, which reports steadily advancing prices on a small volume of transactions. Oil shares show a gradual rising tendency despite the price-cutting war in gasoline. Bonds are firmer, money steady and exchanges irregular.

In the export field July exports exceeded the imports. Exports of wheat, including flour, from the United States and Canada, for the week ended Aug. 16, totaled 6,909,775 bushels as against 6,134,477 last week, although considerably below the same week a year ago.

Car loadings for the week ended Aug. 4 were 1,033,130, a decrease of 7914 from the preceding week, but an increase of 200,457 over a year ago.

Truck sales are showing an improved tone, with manufacturing activity progressing along conservative lines. Industrial centers are leading buyers, but some growth in business is being shown in agricultural districts. Extension of bus lines by municipalities and a general tendency throughout the country for this kind of transportation are reflected in the enlarged plant schedules for bus chassis. Somewhat the same condition, though not so

(Continued on page 406)

G. M. Keller Chosen Head of Steinmetz

Company Expects \$300,000 Additional Working Funds—To Make Passenger Car

BALTIMORE, Aug. 22—A reorganization of the personnel of the Steinmetz Electric Motor Car Corp. accompanied by a refinancing which is expected to add \$300,000 to the working capital has taken place whereby G. M. Keller, who has acted as general manager and treasurer in the company's formative stage, also becomes president.

At the same time it is announced that the company, in addition to manufacturing the Steinmetz electric truck will bring out a passenger car, built on Steinmetz principles, which will be listed in the neighborhood of \$2,000.

It will be a closed job and in appearance will resemble the gasoline type of automobile, although depending upon electric motive power. Dr. C. P. Steinmetz, designer, expects to develop a mileage that will give the new model something close to 100 miles on one charging.

Trucks Being Produced

While the new passenger car is not yet in actual production, 100 trucks are about to be put through at the factory in Arlington.

In the reorganization, Herbert A. Wagner, president of the Consolidated Gas, Electric Light & Power Co. of Baltimore, becomes chairman of the board of directors. W. A. Mihm will serve as secretary and assistant treasurer.

Directors on the new board include Dr. Charles P. Steinmetz of Schenectady, who also is chief consulting engineer; Harry Cook of Albany, N.Y.; H. B. Le Quatte, president of the Churchill-Hall advertising agency of New York; Gerald Priestman of Elizabeth, N.J.; K. E. Turner, purchasing agent of the Steinmetz Corp.; Harrison Wagner of the Consolidated Gas, Electric Light & Power Co., Baltimore, and W. R. Grant, comptroller of Lawrence & Co., New York.

Tire Industry Consumed Most Rubber in Quarter

NEW YORK, Aug. 22—In the manufacture of tires and tire sundries during the second quarter of this year 146,167,791 pounds of crude rubber were used, while all other rubber products consumed only 34,252,502, according to a report made by the Rubber Association of America. The total sales value of the automobile products was \$142,818,771.

Pneumatic casings, consuming 104,611,372 pounds of crude rubber, were valued at \$112,515,398, while tubes, using 23,913,971 pounds, were valued at \$17,214,249. Solid tires for motor vehicles were valued at \$8,237,594 and it required 14,998,567 pounds to build them.

Bus Section Formed by Body Association

Formation of Builders' Commercial Division Deferred Until Show Time

DETROIT, Aug. 22.—The bus section of the Automobile Body Builders Association was formed at the meeting here this week with F. E. Cullison, of the Plymouth Wagon Works, as chairman.

Formation of a commercial body builders division was deferred until a later meeting to be held at about the time of the national car shows or a national truck show. In the meantime manufacturers in both classes who meet here this week will work on an organization and membership plans.

Accepting the chairmanship of the Bus Builders Division, Cullison outlined a number of activities which the division might undertake. Among these are standardizing dimensions and body types, encouraging buying from experienced body makers, discouraging impractical features in construction and reciprocal sales arrangements.

A committee to standardize descriptions and nomenclature was named, as were committees to draw a code of ethics for bus body builders and an emblem and joint advertising committee.

Heading and taking active part in the committees are C. H. Humel, A. W. Herdman, H. H. Foltz, William Morning, W. L. Whitfield, A. R. Keagy and D. H. Wier. At the commercial body meeting, pending the organization of the latter group, a membership committee, headed by Humel as chairman and S. H. Gardner, secretary, was formed which will seek to enroll representatives in this part of the country.

Winther Name and Patents Sold to Separate Buyers

MILWAUKEE, Aug. 21.—Likelihood of keeping Winther Motors of Kenosha, Wis., intact vanished when the stockholders reorganization committee failed to enter a formal bid at the trustee's auction Aug. 16. The personal property was sold in parcels, but real estate and buildings remain unsold. The bids aggregated about \$65,000.

Dallas E. Winslow, representing Winslow-Patterson of Flint, bought the Winther name and service for \$7,000 and will open a parts store in Kenosha for the benefit of 16,000 Winther truck owners.

A. Henderson, Chicago, bought the Winther patents, machinery and tools for \$7,250, with the intention of developing and marketing the design. Junkmen bought materials and surplus parts.

TWO BIDS FOR AIRPLANE PLANT

WASHINGTON, Aug. 20.—But two bids have been received by the War De-

President of Bank Says Attitude Toward Financing of Retail Sales Is Most Favorable

By D. M. McDONALD,
Detroit News Representative of the Class Journal Co.

Detroit, Aug. 22.

MORE money is being loaned by banks for the purchase of cars now than at any other time in the history of the industry, said Emory W. Clark, president of the First National Bank of Detroit, discussing the banking position in this, the greatest of automobile years.

Furthermore, he said, there is every indication that the banks will continue to lend the full measure of their support to the steadily expanding automobile business. There is certainly nothing that would indicate any movement to curb automobile credits—that is, a movement originating in any central source such as the Federal Reserve system.

The business of financing automobile sales has come to be regarded by banks as a most important part of their business, Mr. Clark said. There are few banks in the country which are not welcoming all the automobile business they can get and there are only scattering instances where any but the most favorable attitude is taken in the financing of sales at retail.

Mr. Clark said that it is true that this business is now handled only indirectly, but banks generally have lined up solidly behind the finance corporations of the country, and he cited several instances of banks which are practically specializing in this automobile field. All of the large manufacturing companies, he noted, now have arrangements with finance corporations which provide their dealers with complete financial coverage. Direct transactions between dealer and bank represent only a very small part of the participation by banks in the automobile business of today.

So far as the banks are concerned farmers are free to buy all the automobiles or equipment of any kind that they require, according to Mr. Clark. Any credit required should be forthcoming. There may be a bank here or there which will not advance the credit sought but there will be others that will.

Speaking of the financial condition of the industry itself, Mr. Clark said that any company manufacturing cars or parts which has not made money in the present year might as well go out of business. There has been an overwhelming business, he said, in which practically everybody has shared. Those which have not been handling this business at a profit have no right to be in business.

There is no indebtedness in the industry proper, he declared, and banks are handling loans for the companies instead of loaning them money. There is no money being sought from banks by any of the leading companies.

In his talk Mr. Clark gave the impression of being thoroughly in accord with the system of factory arrangement with the financing corporation. The growth of automobile business, he said, was principally a matter of time sales, and in these the finance corporation, mainly by arrangement with the factory, has enabled the dealer to handle his business without financial difficulty.

partment for the Curtis-Elwood airplane plant at Buffalo, N. Y., which cost the Government between \$10,000,000 and \$15,000,000 to build.

The American Radiator Co. of New York was the highest bidder at the sale, offering \$765,000 and Edward H. Altman of Buffalo submitted an offer of \$606,000 for the entire works.

Coast to Coast Service Established by Airplane

NEW YORK, Aug. 23.—The night-and-day airplane mail service from coast to coast was inaugurated successfully by the Government yesterday. Although the schedule of twenty-eight hours was not maintained, the westward bound plane reached San Francisco 34 hours and 24 minutes after leaving New York.

The eastbound flight was impaired through the failure of the plane that left San Francisco to make connections at Cheyenne. The relief machine at Cheyenne left without waiting for the 'Frisco ship and checked in here last night.

Truck Makers to Study Distribution of Parts

DETROIT, Aug. 23.—To improve parts distribution and service conditions, Motor Truck Industries, Inc., at a directors' meeting here, named a special committee which will make a study of the conditions now existing, and report back to the board Sept. 26. The committee is composed entirely of truck manufacturers as follows: E. A. Williams, Garford, chairman; A. S. More, Selden; W. A. Kysor, Acme, and M. L. Pulcher, Federal.

Working with this committee will be the following representatives of parts manufacturers: A. E. Parsons, Brown-Lipe Gear Co.; George W. Yeoman, Continental; Fred Glover, Timken, and C. A. Dana, Spicer.

The date for the annual meeting of the association was set for Nov. 21, probably in Detroit. At that time the report of this committee on improved parts distribution will be submitted and recommended for adoption.

Stockholders Show Confidence in Collins

Vote at Meeting Almost Unanimous—Will Remain at Head of Company

CLEVELAND, Aug. 20—The administration of R. H. Collins as president of the Peerless Motor Car Co. and the Peerless Truck & Motor Corp. was approved by an overwhelming vote of the stockholders at the special meeting held Friday, in Richmond, Va.

Out of a total of 207,835 shares of stock represented only fifty shares were voted against Collins, and these were in the hands of Charles S. Wachner, attorney for David L. Rockwell, plaintiff in four suits that were brought attacking the contracts which Collins has with Peerless. Votes cast in support of the Collins régime did not include 22,840 shares owned by Collins and the Peerless Motor Car Co.

Collins in giving his proxy stipulated that his stock should not be voted on the proposal as to whether he should remain with the company. "To put this whole matter in a nutshell, I want to know that the people I am working for want me to work for them," Collins said.

Collins tendered his resignation to a committee of directors two weeks ago after Rockwell, a stockholder, filed two suits attacking Collins' contracts. The stockholders and the directors will not consider the resignation, according to information received.

Upon receiving word from the stockholders meeting of the practically unanimous approval given his administration and contracts, Collins stated that his resignation would stand unless he received additional assurances that there would be no further "needless interference with his management."

Branches Set Sales Marks

CLEVELAND, Aug. 20—Eight branches of the Peerless Motor Car Co. during July had sales aggregating nearly \$2,000,000. At three of the branches, Boston, Cleveland and Washington, all previous monthly sales were surpassed.

"This is especially significant," says D. A. Burke, vice-president in charge of Peerless branches, "because it comes on top of the fact that sales by our branches in June were greater than ever before."

In July, however, the Cleveland branch surpassed its own best previous record by more than 30 per cent, Boston advanced its best previous mark by a similar margin, and Washington outstripped its best previous month by more than 20 per cent.

(Continued on page 403)

HOLT HOLDS SCHOOL FOR LUMBER WORKERS

WAUSAU, WIS., Aug. 20—The Holt Manufacturing Co., Inc., Peoria, Ill., has been conducting an eight-day school of instruction in operating and servicing the Holt Caterpillar tractor at Wausau, for the benefit of logging and lumber companies of northern Wisconsin and upper Michigan.

Several hundred owners and operators have participated in the course, which anticipates a promised impetus in the production of logs for 1924 lumber manufacturing in the northern hardwood and hemlock region in the coming winter.

The school was in charge of H. H. Chambers, tractor expert from Holt works.

Court Asked to Restrain Power Truck Stock Issue

ST. LOUIS, Aug. 20—An amended petition has been filed asking for an injunction against the officers and directors of the Power Truck & Tractor Co., restraining the further issuance of stock of the company and the appointment of a receiver.

A similar petition recently was denied. The amended petition further asks that the defendants, P. G. Craven, president, B. B. Craven, vice-president and Clare Acton, secretary and treasurer, be removed as officers of the company.

Judge Mix, before whom the petition was filed, took no action but set a date for a hearing.

Part of Old Milburn Plant Leased by Martin-Parry Co.

TOLEDO, Aug. 20—The Martin-Parry Corp. will open a factory branch here in a portion of the old Milburn Wagon Co. plant on Monroe Street.

The plant has been leased from the General Motors Corp., which purchased it from the Milburn company.

E. Ainsley of the Detroit factory branch will come to Toledo as manager.

It is believed that the plant will be able to handle adequately all of the Willys-Overland business in its line. The Overland company has equipped a number of its stock chassis with Martin-Parry bodies for many years, and the new branch will enable owners to drive away the completed cars from Toledo.

OPERATES LIBERTY TIRE PLANT

MARION, OHIO, Aug. 20—The Studebaker-Wulff Rubber Co. now is operating the plant and property of the Liberty Tire Co. at Carey, Ohio, purchased at a recent receiver's sale for \$43,000. This gives Studebaker-Wulff a capacity of 2000 casings and 2000 tubes a day.

Overland May Float Part of Bond Issue

Action Depends on Continuance of High Earnings During Remainder of Year

TOLEDO, Aug. 20—Financial interests here close to the Willys-Overland Co. believe that the next move of the management will be to float a part of the \$15,000,000 bond issue which was approved by the stockholders at their last annual meeting early this year.

The payment of the \$6,930,000 of bank indebtedness removing the last of the bonded debt of the plant this month made a considerable drain upon the liquid cash of the company despite the record-breaking earnings which have characterized operations for the last seven months.

Net capital actually increased \$2,232,143 during the first six months of the year and approached a total of \$17,000,000 in the working capital accounts.

However, there is a significant fact in the jump of the cash position from \$272,054 on Dec. 31, 1922, to \$7,248,321 on June 30, 1923, and that is its accompaniment by an increase in accounts payable for purchases and other items from \$1,093,466 to \$8,216,812, indicating a temporary sacrifice of this item for the betterment of the bank creditors' position.

Earnings in July and June were nearly \$2,000,000, and business in August has continued at very near that rate.

The issuance of the bonds or a portion of the issue is held to be almost entirely dependent upon the continuance of the high earnings for the remainder of the year. Additional money raised through the bond sale would allow for balance sheet adjustments and put the company in an impregnable cash position, it is pointed out by local financial authorities.

Owner of Stevens-Duryea Claims Would Buy Plant

SPRINGFIELD, MASS., Aug. 22—Harry G. Fisk and Frank H. Shaw, receivers for Stevens-Duryea, Inc., have petitioned the Superior Court for authority to sell the plant at Chicopee Falls at private sale, the sum of \$450,000 having been offered for the property and the petition stating that this was regarded as a fair price. The name of the prospective owner was withheld until the matter comes up for a hearing Aug. 27.

It is stated in the petition that the person seeking to take over the property has in his possession about three-fourths of the total claims against the company.

Receivers were appointed May 9, 1922, on petition of the Fisk Tire Co., and the indebtedness was then stated to be \$1,100,000, and the net assets \$4,124,471.

It is stated by Fisk that the company desiring to buy the plant is not the Fisk Rubber Co.

Pierce-Arrow Forms Finance Corporation

Will Aid Dealers and Distributors—
Forbes President and Frazer
Manager

BUFFALO, Aug. 20—The Pierce-Arrow Finance Corp. has been formed to cooperate with distributors and dealers in giving them specialized credit, collection and discount service, and to develop a plan whereby new Pierce-Arrow motor vehicles may be financed when carried in stock by the distributor.

The new corporation has a paid in capital and surplus of \$250,000, the entire stock being owned by the Pierce-Arrow Motor Car Co. Myron E. Forbes, president of the manufacturing concern, is also president of the finance corporation.

The directors include Walter P. Cooke, chairman of the board of the Marine Trust Co. of Buffalo; Roland L. O'Brian, senior member of the firm of O'Brian, Potter & Co. of Buffalo; Lewis G. Harriman, vice-president of the Fidelity Trust Co. of Buffalo, and Albert Strauss, vice-president of J. & W. Seligman & Co. of New York.

The management is in the hands of Joseph W. Frazer, vice-president and general manager, formerly an executive of the General Motors Acceptance Corp.

Harrison Radiator Plant to Have Double Capacity

BUFFALO, Aug. 20—A contract has been awarded by the Harrison Radiator Corp. of Lockport for a three-story factory building, a duplicate of the present main structure, which will double the capacity of its plant. The building, which will be used mainly for a press-room and machine shop will be approximately 155 by 396 feet. Plans are also being made to enlarge the office building.

When the alterations and construction program have been carried out the capacity of the plant, according to officials, will be increased to upward of 5000 radiators a day. The plant now employs 1300 men, and although the addition will allow for a greater output the number of employees will not increase proportionately.

The cost of the improvements will approximate \$500,000.

Schwab Policies Dominate New American Body Corp.

PHILADELPHIA, Aug. 20—Organization of the American Body Corp., in which Charles M. Schwab is interested, has been completed, and it is announced that the Schwab policies will dominate the activities of the corporation.

Rodney Day has been chosen president; Robert E. J. Corcoran, vice-president; John B. Kilburn, treasurer, and Henry E. Mead, secretary and assistant treasurer.

Directors are Charles M. Schwab, F. S.

FORD TO INVESTIGATE POWER FROM GEYSERS

SANTA ROSA, CAL., Aug. 18—Henry Ford will visit the Pacific Coast in March, 1924, and will spend some time investigating the development of steam power from the geysers of Sonoma County, according to Luther Burbank, the celebrated plant breeder of this city.

Ford is to be the guest of Burbank, the two having been friends for years, and they will make the trip to the geysers, where power is being developed, together.

Approximately 1500 hp. has been developed from one of these geyser groups, and further development is being carried on at this and other groups.

Wheeler, Edward R. Tinker, Elisha Walker, Robert Barr, W. D. Baldwin, Rodney Day, E. M. Champion and H. L. Beyer.

The corporation owns and operates plants in Philadelphia and Detroit, having a combined floor space of approximately 1,500,000 sq. ft.

Petition in Bankruptcy Filed for Bartoo Tire

BUFFALO, Aug. 21—A voluntary petition in bankruptcy has been filed in Federal Court by the Bartoo Tire & Rubber Co. of Buffalo. H. C. Bartoo, president, signed the petition.

Liabilities were listed at \$116,283, of which approximately \$30,000 are secured by a stock of tires and tubes and a building owned by the company.

Unsecured liabilities amount to \$64,350 and there are \$20,700 worth of notes and bills for the payment of which others are responsible. Assets are given as \$58,160.

Most of the debts are owed banks in towns near Buffalo. Buffalo banks are not affected by the bankruptcy. Several tire and rubber companies are holders of claims of less than \$6,000 each.

Franklin Rewards Workers Who Suggest Improvements

SYRACUSE, Aug. 22—Following its policy of making cash awards to employees who suggest improvements in production methods at the plant of the H. H. Franklin Manufacturing Co., a distribution of \$4,564 was made by company officers last week.

The system established in 1921 is proving a great success and so far the company has distributed \$16,227 to employees. Hundreds of valuable suggestions, many of which have been adopted by the company, have developed from the interest of Franklin employees. The purpose of the system is to lower the cost of production and at the same time improve the product.

\$8.29 Share Earned by Stewart-Warner

Report of Corporation for Six Months Puts Current Assets at \$10,870,610

CHICAGO, Aug. 20—The semi-annual statement of the Stewart-Warner Speedometer Corp. shows a net income of \$3,939,346 in the six months ended June 30, after allowing for Federal income taxes, or equivalent to \$8.29 a share, of which \$4.44 was earned the second quarter. In the full year of 1922 the company's net income totaled \$5,335,162, or the equivalent of \$11.24 a share.

The balance sheet as of June 30 shows current assets of \$10,870,610, an increase of nearly \$1,000,000 in three months, as against current liabilities of \$1,881,019, an increase of about \$215,000. The net working capital of \$8,989,591 compares with \$7,362,531 at the beginning of the year and \$7,363,739 a year ago.

Not taking into consideration patents, good-will, trade marks, etc., carried on the books at a valuation of \$10,930,427, the net tangible assets as of June 30 were equivalent to \$31.09 a share on the 474,976 of no par value common stock outstanding, or the highest on record with the company. This compares with a book value of \$29.45 a share on March 31. The intangible assets are equivalent to \$23 a share on the outstanding stock.

The balance sheet is as follows:

ASSETS		
	June 30, 23	June 30, 22
Cash on hand and in banks	\$ 1,370,260	\$ 927,341
Government bonds and other securities	3,550,336	3,761,184
Accts. and notes receiv., less reserve	2,739,185	2,439,029
Inventories	3,210,827	2,177,880
Deferred charges	285,511	177,843
Land, buildings, machinery, etc. less reserve for depreciation	5,493,712	5,664,718
Patents good-will, etc.	10,930,427	10,731,724
Total Assets	\$27,580,262	\$24,952,381
LIABILITIES		
Accounts payable, wages, royalties and taxes accrued	\$ 961,696	\$ 749,829
Provision for income taxes	919,323	265,526
Deferred Liabilities	.....	424,752
Capital stock	*12,467,483	12,644,422
Stewart Manufacturing 8% preferred	.....	271,500
Bonds	.....	1,667,000
Surplus	13,231,759	8,929,351
Total Liabilities	\$27,580,262	\$24,952,381
Current Assets	10,870,610	8,378,094
Current Liabilities	1,881,019	1,015,355
Net Working Capital	\$ 8,989,591	\$ 7,362,739
Book value a share based on net tangible assets (Not including patents, trade marks, good will, etc.)	\$ 31.09	\$ 24.73
*474,976 shares of no par value stock.		

No Bank Loan Shown in Maxwell's Report

Company Reports Net Profits of \$3,072,531 for First Six Months of Year

DETROIT, Aug. 20—Net profits of \$3,072,531, after provision for taxes, insurance, depreciation and interest charges, are reported by the Maxwell Motors Corp. and its subsidiaries for the six months ended June 30, 1923. This is in excess of the aggregate profits for the full years 1919, 1920 and 1922.

The balance sheet as of June 30, 1923, shows net current assets of \$16,788,228, and net current liabilities of \$3,049,627. The current assets include \$2,968,559 cash on hand, \$2,176,085 car shipments against drafts, \$364,266 bank acceptances, \$17,167 customers' notes receivable, \$205,185 customers' and dealers' accounts, \$21,778 due from the Canadian government and \$11,035,184 inventories.

Current liabilities include \$86,309 notes payable, \$2,377,945 accounts payable, \$257,545 accrued interest and taxes, and \$327,831 dealers' and distributors' deposits.

Current Liabilities Decline

In a statement to the stockholders, President William R. Wilson says:

Despite the withdrawal of approximately \$2,500,000 in cash from the corporation's working capital June 1, to liquidate the last of its series B notes, cash and cash securities on hand June 30 were \$271,232 more than on Dec. 31, 1922. Current liabilities of \$3,049,627 showed a decrease of \$929,403 against those of Dec. 31.

The strong financial position of the corporation is shown in the fact that despite total payments of more than \$11,000,000 against the Maxwell funded debt during the past eighteen months, there remained on hand June 30 nearly sufficient cash to retire the entire series C notes, the last funded indebtedness against it. These notes, of a face amount of \$3,889,619, are not due until June 1, 1924, although they may be called for redemption earlier.

The balance sheet also shows that Maxwell and its subsidiaries are entirely free from bank loans, an unusual condition when it is considered that the corporation manufactures practically every part used in its cars.

Prices of Willys-Knight Lowered from \$50 to \$145

TOLEDO, Aug. 19—Willys-Overland, Inc., has announced price reductions of \$50 on the Willys-Knight roadster and phaeton, and \$145 on the coupe-sedan, the new prices being \$1,175, \$1,175 and \$1,550 respectively. Other than some detailed improvements, no mechanical changes have been made in these models.

In the Overland, while the prices remain unchanged, the bore of the engine has been increased $\frac{1}{8}$ of an inch, making it 3 $\frac{1}{2}$ inches, the engine now being of

"PLEASURE" TABOOED AS CAR DESIGNATION

ALBANY, N. Y., Aug. 22—A petition has been filed with the State Tax Commission by the New York State Automobile Merchants Association, the Automobile Merchants Association of New York City, the Brooklyn Automobile Dealers Association and motor car owners in general asking for a revision of the application blanks for registering cars, which will eliminate the term "pleasure cars" and substitute "passenger cars" in designating motor vehicles other than omnibuses and commercial cars.

"The automobile merchant today is selling transportation," says Edward A. Moree, secretary of the New York State association and also general manager of the merchants' association. "There is no use of an automobile that makes it a 'pleasure car' that would not in a similar case make a railroad train a 'pleasure train'."

the same dimensions as that of the "Red Bird." Although no other major mechanical changes have been made, numerous improvements have been incorporated in the design.

Texas Leads, Iowa Second in Highway Construction

WASHINGTON, Aug. 23—The progress report on Federal-aid highways, made public this week by the United States Bureau of Public Roads, shows that on July 31 a total of 23,297 miles of highways have been completed, with 14,771 miles under construction and 53 per cent completed.

To date a total of \$540,000,000 has been expended on Federal-aid highways, and \$65,000,000 is being expended for the current fiscal year. Texas, the figures show, leads in highway construction, there being 1321 miles now under construction in that State; Iowa comes second with 881 miles and Missouri third with 697 miles.

The average cost per mile is \$17,500, the bureau's figures show. Of this 22 per cent is spent for grading, 58 per cent for surfacing, 16 per cent for structures, 1 per cent for shoulder and 3 per cent miscellaneous.

JULY BIG OVERLAND MONTH

TOLEDO, Aug. 20—The output of Overland and Willys-Knight cars for the month of July reached a new high production figure of 23,121 cars, making the past month the largest in the history of the company. July production was more than 1000 in excess of June figures. July 31 recorded the largest single day's production in the history of the Willys-Overland plant, with 1109 cars.

Hudson Puts Stock on \$3 Annual Basis

Report Shows That Net Income of Company for Last Six Months Was \$4,446,039

DETROIT, Aug. 22—Directors of the Hudson Motor Car Co. have placed the capital stock of the company on a regular \$3 annual dividend basis by declaring a quarterly dividend of 75 cents a share, payable Oct. 1, to stockholders of record Sept. 20. Heretofore the company has been paying off quarterly dividends of 50 cents each and in addition an extra payment of 25 cents a share quarterly.

In the semi-annual report it is stated that the company's net income for the six months was \$4,446,039 after all charges, taxes and depreciation as compared with \$3,041,774 for the corresponding period last year. The report shows that the company has over \$12,000,000 cash and its equivalent on hand. Net current assets were estimated to be between \$12 and \$15 a share on the stock.

Productions reports show that in the first seven months of the calendar year as many cars were produced as in the full year of 1922, with earnings close to \$6,000,000, or the equivalent of \$5 a share on the 1,200,000 shares of no par common stock.

Schedules in recent months have been running close to 10,000 cars monthly, with earnings averaging about \$1,000,000 monthly, so that it is estimated that in the current year the company will earn its \$3 dividend approximately two and one-half times.

Says Planes Will Make Big Accessory Market

CHICAGO, Aug. 20—Manufacturers of automotive equipment who are members of the Automotive Manufacturers' Association listened eagerly to the forecast of automotive transportation in the air which was given in an address at the association's meeting last week by Major Reed Landis, American war-time aviator and now chairman of the American Legion's aviation committee.

Major Landis declared that within the next ten years thousands of airplanes will be in service transporting passengers and commodities from coast to coast.

Firms which now are manufacturing equipment for automobiles will in a few years have a vast market for similar equipment for airplanes, Major Landis said. He spoke of the large number of spark plugs and piston rings required for the multi-cylinder engines of airplanes. Accessories of various kinds will be required in great numbers, he said. The wise automotive manufacturer should be prepared to participate in the business he believes is certain to develop.

Trolley Strike Wins Favor for Motor Bus

New Jersey Experiences No Trouble by Halting of Service Throughout State.

NEWARK, N. J., Aug. 20—Three weeks of idleness for the trolleys, caused by a statewide strike of employees, which have forced the residents of the State of New Jersey to turn to motor transportation, has demonstrated the utility of the motor bus and the jitney in a manner that is most satisfactory to those who demand the abolition of the trolleys as one means of solving the traffic problems of the present day.

This is particularly noticeable in Newark, the fourteenth largest city in the United States, in which there are 400,000 people who heretofore have depended upon the trolleys for transportation. With the coming of the strike, these 400,000 have discovered that the motor vehicles can carry the transportation burden without semblance of disorder and with dispatch.

Traffic Moves Quicker

An investigation of the situation shows that without trolleys street traffic now is about 35 per cent faster than before, a fact that has aided materially the cause of bus operators. By speeding up the vehicles, congestion has been reduced to a minimum mainly because the fifteen-foot space occupied by the trolley tracks now can be used by the automobiles. This leaves the curb and the space between it and the tracks open to vehicles which are planning to make stops along the way. Vehicle parking, too, has been greatly simplified because of the greater street space available.

Since the strike there has been only one serious street accident in Newark, which is taken to mean that a trolleyless city would be much safer for the pedestrians. It is estimated that for every seven trolley accidents in the city of Newark there is only one for which the motor bus is responsible.

Five Cent Rate Holds

As proof of the manner in which the bus interests have met the present emergency, it is pointed out that they are handling 300,000 more passengers a day than before the strike. This is being done at the old five cent rate, which is three cents lower than the trolleys charged and applies to the same territory. There are seventeen bus lines paralleling existing street car tracks, an aggregate mileage of 130 miles. None of these routes is less than five miles in length and some are ten.

The Newark buses are being operated under the direction of the New Jersey Auto Bus Association, which prior to the strike had 500 of these vehicles in operation, carrying 200,000 daily. When the

strike was declared fifty buses were brought from New York and 125 from Connecticut and other States. All of these outside buses were subsidized by the association at the rate of from \$40 to \$60 a day, according to the seating capacity of the buses, which is in the nature of a guarantee.

The seventeen bus lines operate under a system of profit pooling, drivers being allowed to hold out a certain fixed sum, according to the size of the bus, from the daily earnings. Profits exceeding that amount are turned into the association. If the day's receipts do not equal the amount named, the association pays the difference. So far, however, the system has worked so well under the pooling systems that these guarantees have been paid out of the profits.

As to the handling of the bus traffic, it has been found that in the evening some delay has been caused by everyone wanting to get aboard at the same time, but in the morning it is different. Passengers are strung out along the route in the morning and consequently there is not the jam. So far the New Jersey people seem well satisfied with the emergency transportation and hereafter will listen with more comprehension when abolition of the trolleys is advocated.

Ford Cars Redesigned Without Price Change

DETROIT, Aug. 23—The Ford Motor Co. is now in production on its improved models, the principal changes being the elevation of the radiator and hood lines. There are no new models added to the line. The two door sedan, which has been a feature for a number of years, is withdrawn. In its place the company is offering the four-door sedan which was first brought out last year but on which it has never gone into heavy production.

There are no price changes and the four-door sedan will sell at \$725, the price fixed when first announced. No changes were noted in the mechanical features.

The change to the new line was made without perceptible interruption of the factory schedule, although the regular production run fell off about 5000 during the week. Business reported from dealers is still far in excess of factory capacity. All shipments since early this week have been of the redesigned line, and the factory reports dealer stocks of the former model completely cleared.

Road Builders Prepare for Convention in 1924

CHICAGO, Aug. 22—Plans for the 1924 convention and show of the American Road Builders Association have been practically completed. These two events are to be held in Chicago simultaneously the week beginning Jan. 14.

The convention headquarters are to be in the Congress Hotel. The road show will be held in the Coliseum and the adjoining Greer Building.

New Jersey Railway Would Control Buses

Demands Elimination of Competition When It Grants Increases in Wages

NEWARK, N. J., Aug. 22—The trolley strike in New Jersey has been settled so far as the company and the employees are concerned but the motor buses are proving the stumbling block toward restoring trolley transportation to the 145 municipalities in North New Jersey which have been tied up since Aug. 1 because of the dispute over wages.

The Public Service Railway Co. has made a proposition to increase wages 20 per cent which has been accepted by the strikers, and also demands the elimination of motor bus competition. It wants all competing buses driven off streets on which trolley tracks are laid and expresses its willingness to operate buses itself as feeders to its trolley lines.

The company declares that "it has been ascertained by hard experience the country over that cars and buses cannot economically exist in direct competition with each other upon the same streets, and wherever the issue has arisen the necessity for railway transportation has manifested itself. It is possible to settle the whole problem and it should be done now once for all."

Wants to Purchase Buses

Outlining its plan, the company undertakes to "purchase at their present fair physical value all buses operating competitively the day before commencement of the strike on the streets where the railway company's tracks are laid, whose owners are willing to sell." Under the second clause of the plan, "thereafter the companies will operate cars and buses in co-ordination to the extent found necessary to accommodate the traffic."

The third clause provides that licenses of all owners selling out should be revoked, likewise those holding temporary permits, the alternative for those who wish to retain their property to be that they ply their trade thereafter on streets not occupied by the company's rails.

The Public Utilities Commission of the State, while accepting the plan, declares that so far as the bus proposition is concerned, it is up to the individual bus owner to accept or reject. The bus owners declare they will fight the issue.

AVIATION COMPANY IN CHILE

WASHINGTON, Aug. 22—The establishment of commercial aviation in Chile is now being considered by the Chilean Congress, Trade Commissioner W. E. Embry at Santiago has cabled the United States Department of Commerce. A company, whose capital is reported to be 30,000,000 pesos, is ready to undertake the work as soon as the proposed law becomes effective.

M.A.M.A. Arranges Convention Program

Topics and Subjects Selected and Only Few Speakers Remain to Be Announced

NEW YORK, Aug. 20—Members of the Motor and Accessory Manufacturers Association have received from J. M. McComb, chairman of the general program committee, the tentative program for the fall convention of the M. A. M. A., which is to be held at the Copley-Plaza Hotel, Boston, Sept. 19-22.

The convention theme is to be "Widening the Market for Automotive Products."

WEDNESDAY, Sept. 19, 2 p.m.

Opening of convention, W. O. Rutherford, president, M.A.M.A.

Address of welcome, James M. Curley, mayor of Boston.

Report of M. L. Heminway, general manager, M.A.M.A.

Subjects and Speakers:

"Building More and Better Roads," Roy D. Chapin, chairman, Hudson Motor Car Co.

"Providing Ample Space to Drive and Park Cars in Our Cities," Dr. John A. Harris, deputy police commissioner, New York City.

"Reducing Maintenance Costs and Increasing Service Efficiency" (speaker to be announced).

"Removing Unfair Automotive Taxes," Harry Meixell, secretary, Motor Vehicle Conference Committee.

Wednesday, Sept. 19, 8 p.m.

Topic

"Widening the Market for Automotive Products by Developing Jobber Distribution."

Subjects and Speakers:

"The Advantages of Selling Both the Jobber and the Dealer," E. P. Chalfant, chairman, Gill Manufacturing Co.

"Promoting Sales through Jobbers," Ray W. Sherman, business counsel, the Class Journal Co.

"Why We Sell through Exclusive Territorial Distributors Only" (speaker to be announced).

THURSDAY, Sept. 20, 10 a.m.

Topic

"How to Sell More and Lose Less."

Subjects and Speakers:

"Credit-Granting Problems in Selling the Jobber" (speaker to be announced).

"Fact Versus Opinion in Determining Credit Enlargements" (speaker to be announced).

"When to Call a Meeting of Creditors," O. W. Myers, district credit manager, Goodyear Tire & Rubber Co.

"How to Proceed in the Event of Bankruptcies and Receiverships," Sidney S. Meyers, general counsel, M.A.M.A.

Thursday, Sept. 20, 2 p.m.

Topic

"Delivering the Goods."

Subjects and Speakers:

"How the Railroads are Preparing to Move the Product of the Automotive Industry," Gerrit Fort, vice-president, Boston & Maine Railroad.

"The Shipper's Idea of Adequate Railroad Service," W. H. Chandler, traffic manager, Boston Chamber of Commerce, and former president, National Industrial Traffic Managers' League.

"Shippers' Distribution Problem," W. M. Twohig, traffic manager, Willard Storage

9 EGYPTIAN STUDENTS MAKING TOUR OF EAST

WASHINGTON, Aug. 18—The nine Egyptian students, who are taking a two-year course in the United States, studying every phase of the automobile industry at the expense of the Egyptian Government, are being given a three weeks' plant inspection trip by the automotive division of the United States Department of Commerce.

The students, accompanied by L. E. Warford, formerly of the National Automobile Chamber of Commerce, are touring the East and will make stops at practically all the big automotive plants in that section. On completion of the trip about Sept. 1 they will return to their studies in Detroit.

Battery Co., or M. J. Fitzgerald, general traffic manager, General Electric Co.

"Classification Problems Affecting the Parts Manufacturers" (speaker to be announced).

Thursday, Sept. 20, 6 p.m.

Boat trip, shore dinner and dance, Pember-ton Inn, Nantasket Beach.

FRIDAY, Sept. 21, 10 a.m.

Topic

"Selling the World American Motor Transpor-tation."

Subjects and Speakers:

"A First-hand View of the European Situation and Overseas Market," John F. Kelly, Jr., export manager, Electric Storage Bat-tery Co.

"Putting over the Message of American Quality and American Service," F. E. Titus, sales manager, International B. F. Goodrich Co.

"How the Smaller Manufacturer Can Get Foreign Business," S. W. Dorman, vice-president and general manager, Overseas Motor Service Corp., and chairman, M.A.M.A. Foreign Trade Committee.

Friday, Sept. 21, 2 p.m.

Topic

"How Advertising Can Help Sell More Automotive Products."

Subjects and Speakers:

"Are We Properly Meeting the Need for Improved Traffic Conditions?" H. W. Slauson, engineering service manager, Kelly-Spring-field Tire Co.

"How Better Brake Equipment Can Sell More Cars" (speaker to be announced).

"How the Advertising of the M. A. M. A. Members Can Help the National Automobile Shows," Samuel A. Miles, manager, New York and Chicago shows.

SATURDAY, Sept. 22.

Golf tournament at Country Club.

PAN AMERICAN DIVIDEND

DECATUR, ILL., Aug. 20—Judge J. S. Baldwin has ordered payment of a 12½ per cent dividend to creditors of the defunct Pan American Automobile Co. This is the first payment to creditors and comes from the sale of personal property. Another payment is expected to follow closely upon the real estate sale.

Company in Canada Handles Ford Paper

Arrangements Made by Dominion Organization with Traders' Finance Corporation

MONTREAL, QUE., Aug. 22—An arrangement has been completed between the Ford Motor Co. of Canada, Limited, and the Traders' Finance Corp. (Canada), Limited, whereby the latter will handle the entire wholesale and retail acceptances of Ford dealers throughout Canada and thus establish a uniform charge to the public on Ford products sold on the deferred payment plan.

Previous to this arrangement the public were paying various charges to numerous companies. The new arrangement will affect an average saving of 15 per cent to car purchasers.

The company anticipates the volume of business that will be handled this year on this one project alone in the neighborhood of \$30,000,000.

The Traders' Finance Corp., which is the largest Canadian company of this nature, was originally formed in Winnipeg and has a paid-up capital of \$2,250,000.

It is composed mostly of Western business men, namely: E. W. Kneeland and R. T. Evans of the British-American Elevator Co., Limited; R. R. Wilson of Campbell Bros. & Wilson, Limited; Andrew Kelly, president, Western Canada Flour Mills Limited; W. W. Evans, president and managing director Toronto Casualty Marine Fire Insurance Co., and C. V. Cummings, Northern Construction Co., Limited, of Vancouver.

Since the opening of the eastern offices in Toronto and Montreal several local business men have been added to the board. It is understood E. R. Decary will be added to the Montreal board.

Control of Sterling Tire Sold by Charles A. Bates

NEW YORK, Aug. 20—Charles Austin Bates has disposed of his controlling interest in the Sterling Tire Corp. of Rutherford, N. J., which he organized in 1908, and has withdrawn entirely from the management of the concern, which now is under the direction of A. A. Altschuler, president since 1919.

Altschuler also is president of the International Fidelity Insurance Co. of Jersey City. Associated with him in the Sterling company are Otto Basten, production manager for ten years, who now is vice-president; Joseph A. Miller, who has been treasurer since the organization of the company, and W. A. Ryan, secretary and auditor.

Directors of the company are: J. M. Rector, Walter Little, Frank A. Ball, F. J. Schwarz and Herbert R. Welch.

The company reports that in 1922 it produced 244,000 tires, which it sold for \$2,707,257.

Improvements Shown in New Reo Phaeton

Increased Offset Permits Lowering of Frame Channels of Model 2 In.

LANSING, Aug. 22—Several refinements are to be found in the new line of the Reo Motor Car Co. A five-passenger phaeton, priced at \$1,335, is the forerunner of this line and embodies the various improvements.

Frame channels are now approximately 2 in. lower as the result of an increased offset. The height overall of all body types has been reduced by a like amount in conjunction with this change. The semi-floating rear axle has been improved and now carries larger brake drums of 15-in. diameter and 2½-in. face.

Another mechanical change of a different nature is the transmission lock, which is interconnected with the starter switch. No key is required for locking, as it is only necessary to swing a disc one-fourth of a turn around the starter plunger and then depress the plunger to lock the car.

This action causes a hardened steel pawl to lock both the disc and the starter plunger, so that they cannot be unlocked until the proper key is inserted in the Yale lock. With this arrangement depression of the starter plunger is impossible as long as the transmission gears are in mesh.

Body Is Improved

Several improvements have been introduced in the new phaeton body, which is similar in appearance to the older phaeton. A tool compartment has been located under the front seat board. Panelled doors fitted with locks permit access into this compartment from either side without disturbing any passenger in the front seat. Extra seats making a seven-passenger capacity may be obtained as an extra.

The cowl ventilator, side wing windshield and nickel and aluminum trim are continued in this open model. Two standard finishes are provided, one being blue with white pencil striping, parallel with the trim rail, and the other gray with similar striping.

Bethlehem Now Producing Its 1924 Line of Trucks

ALLENTEWON, PA., Aug. 20—The Bethlehem Motor Corp. has started production on its 1924 series of trucks.

The principal refinement is the adoption of the new Eaton spiral bevel rear axle on its Airline 1-ton model. The 3½ x 5 engine, made by the company, has been retained, as have the chassis magazine oiling system, the Bethlehem patented manifold, Zenith carburetor and Stewart-Warner vacuum feed.

All standard types of bodies manufac-

tured in the Bethlehem shops are fitted to this model.

The corporation has just made delivery of the first of its new combination hose cart and chemical engines. This is mounted on the Airline 1-ton truck chassis and is equipped with two 50-gallon chemical tanks, ladders, hose reel and other fire-fighting equipment. The unit lists at \$2,810.

Changes Made in Moon's New 6-Cylinder Series

ST. LOUIS, Aug. 20—The Moon Motor Car Company has announced a new line of six-cylinder cars known as series U-6 40. The major components of these cars are the same as those formerly used.

A change has been made in the fuel vaporizing arrangement, a series of fin-like shutters in the intake manifold acting in connection with the hot exhaust to vaporize the fuel. The transmission gears are larger in diameter than they were previously.

The Timken rear axle is of the "centralized carrier" type, which permits of using a flat bevel ring gear instead of the bell type. The pinion shaft is supported on both sides.

There has been practically no change in the body lines of the new series, which is available in five types, touring sport, phaeton, roadster, sedan and sport sedan.

There has been no increase in prices.

Massachusetts Gasoline Tax Law to Go to Voters

BOSTON, Aug. 22—The necessary signatures—15,000 in four counties—have been secured to prevent the Massachusetts 2-cent gasoline tax law from going into effect until the voters have a chance to pass upon it. When the bill was passed, the motor representatives requested a referendum on it.

In Boston alone the signatures rolled up more than 10,000. Announcement of the receipt of the signed petitions by Secretary of State Cook automatically will stop the law from becoming effective. It will not be voted on until a year from next fall.

Franklin Sedan Output Doubled Over Last Year

SYRACUSE, N. Y., Aug. 15—More than twice as many sedans were produced by the Franklin Automobile Co. during the first seven months of this year as were turned out by Franklin during the corresponding period of 1922, the company reports.

The number of sedans produced during the period beginning Jan. 1 and ending July 31 is reported to show a 9 per cent increase over sedan production for the entire year of 1922. Orders on dealers' books at the end of July showed 53 per cent for sedans.

Sixty-nine per cent of orders placed with Franklin dealers during July was repeat business, according to S. E. Ackerman, sales manager.

Army Enters Planes for St. Louis Races

Air Service to Be Well Represented at International Event in October

WASHINGTON, Aug. 20—That the army will be well represented in the international air races at St. Louis, Oct. 1-3, is evidenced by the announcement by Major General Mason M. Patrick, head of the Army Air Service, of the entries from this branch of the service.

Three army entries are made in the Pulitzer trophy race. Lieut. A. Pearson of McCook Field will fly a Verville-Sperry, his alternate being Lieut. J. K. Cannon of Kelly Field. J. D. Corkillo of Brooks Field is named with a Curtiss, his alternate being Lieut. H. H. Mills of Fair Field. The third nomination is that of Lieut. W. Miller of Crissy Field in a Curtiss, with Lieut. L. V. Bean of Bolling Field as alternate.

Five service type pursuit planes were declared for the Mitchel trophy race as follows:

M.B.-3, Lieut. T. W. Blackburn; Lieut. Leland C. Hurd, alternate. M.B.-3, Lieut. Thomas K. Matthews; Lieut. Hobart R. Younger, alternate. M.B.-3, Lieut. George P. Tourtellot; Lieut. Arthur G. Liggett, alternate. M.B.-3, Russell L. Meredith; Lieut. Louis C. Simon, alternate. M.B.-3, Lieut. J. T. Johnson; Lieut. Arthur M. Haugh, alternate. All the pilots and alternates in this event are from Selfridge Field.

Two-Passenger Plane Entries

Eleven two-passenger planes will represent the army in the third event:

D.H. 4-B, Major Roy S. Brown of Maxwell Field; C. L. Tinker of Fort Riley, alternate. D.H. 4-B, Lieut. J. L. O'Connell of El Paso; E. M. Powers, alternate. D.H. 4-B, D. M. Outcault, Officers' Reserve Corps, Cincinnati; Major Robertson, Officers' Reserve Corps, St. Louis, and Lieut. H. W. Beaton of Bolling Field, alternates. X.B. 1-A, Lieut. W. L. Larson of Kelly Field; Lieut. P. T. Wagner of Kelly Field, alternate. X.B.A., B. J. Malley of Nashville; Lieut. A. S. Gilbert, alternate. C.O.4, W. H. Brookley of McCook Field; Lieut. C. McMullen of Brooks Field, alternate. C.O. 4, Capt. R. Oldys; H. N. Helson of Brooks Field, alternate. C.O.5, Lieut. L. H. Smith of Rockwell Field; Lieut. E. B. Robins of Chanute Field, alternate. L. E. Frere plane, Lieut. S. M. Connelley of Mitchel Field; Lieut. V. E. Bertrandis of Mitchel Field, alternate.

Seven large-capacity army planes have been nominated for the fifth event:

Martin bomber, E. C. Black of Langley Field; Lieut. H. D. Smith, of Langley Field, alternate. Martin bomber, Lieut. L. Wade of McCook Field; Lieut. H. D. Smith of Langley Field, alternate. Martin bomber, L. P. Arnold of Bolling Field; Major J. H. Pirie of Aberdenn, alternate. Martin bomber, Lieut. H. L. George of Aberdenn; Major J. H. Pirie of Aberdenn, alternate. T.-2 plane, Lieut. H. G. Crocker of Kelly Field; Lieut. G. H. Beverley of Kelly Field, alternate. D.B.-1 plane, M. S. Fairchild of McCook Field; alternate to be named. D.T.-2 plane, pilot and alternate to be named.

Men of the Industry and What They Are Doing

Earl G. Gunn Goes Abroad

Earl G. Gunn, chief engineer of the Lafayette Motors Co., has sailed for Europe, where he will investigate foreign engineering practice.

Jennings C. G. Spring Treasurer

J. J. Jennings, formerly partner of E. E. MacCrone & Co., member of the New York Stock Exchange, has been made treasurer of the C. G. Spring Co. of Delaware and assistant treasurer of the C. G. Spring Co. of Illinois, the C. G. Spring Co. of Michigan and the C. G. Spring Co. of Ohio. He will be located at the headquarters of the company in Detroit.

George H. Strout Resigns

George H. Strout has resigned as Eastern district representative and export manager of the Apperson Brothers Automobile Co. after fifteen years' connection with the company. It is likely that he will enter the export business for himself.

Chandler Promotes Filiatrault

E. J. Filiatrault has been promoted from assistant to purchasing agent of the Chandler Motor Car Co. to fill the vacancy caused by the death of Roy McCormick Fraser. Mr. Fraser died recently after seven years' service with the Chandler company.

Padgett with Beneke & Kropf

J. E. Padgett, formerly sales engineer for the Weidely Motors Co. and vice-president of the Carburetor and Accessories Co. of Indianapolis, Stromberg carburetor distributor for that State, has severed both connections and is now representing the Beneke & Kropf Manufacturing Co., manufacturer of Rayfield carburetors, as sales engineer. His offices are in the David Whitney Building, Detroit, where he will be associated with George H. Hunt, sales manager.

McElhone Advertising Manager

Arthur J. McElhone has been appointed advertising manager of the Eaton Axle & Spring Co. of Cleveland. McElhone for years has been connected with the service department of the Class Journal Co. and of late has specialized on bumper advertising of the Cox Brothers Manufacturing Co., which recently affiliated with the Eaton company.

Davis Succeeds Carpenter

Francis B. Davis, Jr., has succeeded R. R. M. Carpenter as general manager of the pyralin department of E. I. duPont de Nemours & Co. Davis is a former duPont man, who was transferred to the General Motors Corp. and called back to become Carpenter's assistant. R. W. Brokaw has been advanced to the posi-

tion of assistant general manager, made vacant by Davis's promotion.

Robins Sails for Europe

H. M. Robins, director of foreign sales of Dodge Brothers, sailed from New York on the Leviathan on Aug. 18. He will visit England and various continental countries and will not return to Detroit for several months.

McMeans Rollins Distributor

A. L. McMeans, for many years treasurer of Dodge Brothers, and his brother, T. E. McMeans, Dodge Brothers distributor in central Pennsylvania, with headquarters in Johnstown, have taken the Rollins Motors Co. franchise for San Francisco and the bay counties in northern California. A. L. McMeans will have his headquarters for the Rollins four at Oakland, and T. E. McMeans will use San Francisco as a base.

L. L. Hardin Resigns

L. L. Hardin, treasurer of the Anderson Motor Co. at Rock Hill, S. C., has resigned, effective Sept. 1, to become associated with the Hawthorne and Hampshire textile mills at Clover, S. C.

Johnson Insurance Trustee

Herbert F. Johnson, head of S. C. Johnson & Son Co., Racine, Wis., manufacturing automobile waxes, finishes, varnishes, etc., and now serving as receiver of the Mitchell Motors Co., has been elected a trustee of the Northwestern Mutual Life Insurance Co. of Milwaukee.

Robert Bosch Appoints Acker

Leon F. Acker has been added to the sales staff of the Robert Bosch Magneto Co., Inc., of New York. He served as assistant branch manager of the old Bosch Magneto Co. from 1910 to 1917, later becoming identified with the Manhattan Electrical Supply Co. and the Simms Magneto Co.

Irrgang Joins Cowan Truck

William F. Irrgang, for seven years president of the Warren & Irrgang Co., manufacturer of factory trucks and trailers at Springfield, Mass., has joined the Cowan Truck Co. of Holyoke, Mass., as designer of special equipment for material handling by industries and railroads. Irrgang expects to dispose of his interest in the first-named concern, which recently took over a factory building in Chicopee, Mass.

Bramman Manager of Motors Parts

W. H. Bramman, formerly sales manager of the Universal Machine Co., has been made general manager of the Motor Parts Corp., 1419 North Charles Street, Baltimore.

Hudson Returns Home

R. G. Hudson, export manager of the Reo Motor Car Co., arrived in New York on the Aquitania on Aug. 17, following a four months' trip to Europe. Hudson visited England, France, Belgium, Germany, Holland, Denmark and Norway and Sweden, appointing distributors and making arrangements for furthering the sales of Reo cars and trucks.

Kelly Back from Overseas

F. J. Kelly, Jr., export manager for the Electric Storage Battery Co., has returned to New York after a two months' trip to England and other countries.

Kliesrath Consulting Engineer

Victor W. Kliesrath, identified with the magneto field for many years, has established himself as a consulting engineer at 120 Broadway, New York City, prepared to handle general advisory work in connection with problems of design, patents, organization, production, sales and service; to make complete investigations and appraisals for banking institutions and investors and to give assistance in financing propositions of merit. Kliesrath is a member of the S. A. E., A. I. E. E. and A. S. M. E.

Ask Trustee for United Automobile Association

WASHINGTON, Aug. 21—The United Automobile Association, organized during the last six months for the purpose of lowering the expenses of automobiling, has been asked for an accounting of its funds by two stockholders.

The company was organized for \$100,000, and at the present time has more than 1500 stockholders in Maryland, Virginia and the District of Columbia. Under the organization plan the stockholders were to have been permitted to buy gasoline and accessories at a considerable reduction in cost.

The two stockholders have filed a suit in the District Supreme Court, asking for the appointment of a trustee for the association. They allege that the affairs of the association are being mismanaged. The complaining stockholders are Amos V. Pankey and Joseph L. Ramsay.

Stockholders named as defendants are Noah R. Robinson, president; Alvah W. Beckett, vice-president and Eva K. Fisher, secretary-treasurer of the Riggs National Bank, custodian of the association's funds.

FORD MAY BUY SILICA LAND

SHEFFIELD, ILL., Aug. 23—Rumors were current here that the Ford Motor Co. planned a branch factory near Ottawa. The company is said to have taken options on a 64-acre tract of silica land south of the Illinois River at Ottawa.

Murphy's Trip Cost Him American Title

Contest Board of A. A. A. Wipes Out 1070 Points He Won Here in Past Performances

NEW YORK, Aug. 21—Jimmy Murphy, American champion race driver, has lost his chance of retaining his title this year because of his European invasion. When he sailed two weeks ago, he had a clear lead over his closest rival, Eddie Hearne, and was apparently a sure winner of the 1923 championship.

Murphy's credit of 1070 points was wiped out today by the Contest Board of the American Automobile Association, which met for the first time under the direction of the new chairman, Joseph Mack of Detroit. It acted under the rule which requires the five leaders in the championship contest to appear at championship meets.

Misses American Races

By leaving in the middle of the racing season to drive a Miller Special for Count Zbrowski in the speedway meet at Milan, Italy, Sept. 9, Murphy will be unable to drive at Altoona, Pa., on Sept. 3, at Fresno, Cal., on Sept. 29 and Kansas City on Oct. 17 as required by the rules, although he will be back in time for the Thanksgiving Day race at Los Angeles.

The Contest Board ruled that Murphy should lose the 1070 points he had scored in this year's races because of the A. A. A. rule requiring the appearance of the leaders in all the big meets.

It was held that when Murphy went to France two years ago, where he won the French Grand Prix, he went as a representative of America, being on the team selected by the A. A. A., whereas on the present trip he is driving for a European sportsman.

His absence from American competition is felt to be a serious blow to American promoters, who thus lose their star attraction.

Counting Murphy out in this manner makes Eddie Hearne leader in the title battle with 802 points, and Tommy Milton, who won the Indianapolis race in an H. C. S. Special this year, second with 800. Harry Hartz is third with 520, Benny Hill fourth with 350 and Earl Cooper fifth with 310.

Murphy Goes to Milan

PARIS, Aug. 11 (*by mail*)—Jimmie Murphy, arriving here a week ago, has moved down to Milan to prepare for the European Grand Prix 500-mile track race. Twenty cars have been entered for this race, which will be run on the Monza track on Sept. 9. The firms represented are Fiat (3), Alfa-Romeo (3), Benz (3), Steiger (3), Voisin (3) Roland-Pilain (2), Miller (3).

While little is known of the ability of the German cars, it is expected that the real fight will be between the Fiats



Joseph E. Mack, new chairman of the Contest Board of the American Automobile Association, which has counted Murphy out of the 1923 championship because the latter's European trip prevents his finishing the remainder of the American racing season

and the Millers, the favorites being Pietro Bordino and Murphy. There has been considerable comment at the refusal of Mercedes to enter this race on the grounds that Italy has tacitly approved the action of France in the Ruhr.

Sunbeam, the winner of the French Grand Prix, objects to the use of super-chargers on limited piston displacement engines. In filing his entry Gabriel Voisin declares that he has no expectation of winning, but being convinced that France ought to have a speedway, he is taking part in this race for the lessons to be learned from it.

Virginia Revives Talk of 2½-Mile Speedway

WASHINGTON, Aug. 22—The erection of a two and one-half mile speedway that will rival the Indianapolis track is again being considered by local automobile men in conjunction with officials of the American Automobile Association and representatives of the Indianapolis speedway.

The proposed site is situated at Glen Allen, Va., 100 miles from Washington.

UNITED SERVICE MEN ON TRIP

DETROIT, Aug. 17—Ralph S. Lane, president; F. A. Oberheu, sales manager, and D. M. Sweeney, supervisor of distributors of United Motors Service, will leave this city Sept. 4 on a three months' trip, visiting nineteen branches of the company to determine the present day demand and tendencies along service lines.

Stockholders Show Confidence in Collins

Vote at Meeting Almost Unanimous—Will Remain at Head of Company

(Continued from page 396)

Sales of used cars for July throughout the Peerless branches were the largest in Peerless history.

Collins to Keep Presidency

CLEVELAND, Aug. 22—Richard H. Collins will remain as president and active executive head of the Peerless Truck & Motor Co. This was declared at a meeting of a special committee named to consider his resignation submitted to the board of directors at the time stockholders' suits were instituted some weeks ago.

Under the terms of the agreement reached between Collins and the committee, his salary of \$150,000 will be adjusted on a mutually satisfactory basis. Collins stated that the commission of \$65 per car sold by the company, as paid to him during the last year, will be eliminated under the new agreement.

The outcome of the meeting is considered by those closely informed on the affairs of the Peerless company to complete the vindication of Collins' regime as executive, begun with the vote of confidence by stockholders of the company a week ago at its corporate headquarters in Richmond, Va.

Exact terms of the new contract negotiated between Collins and the directors' committee were not disclosed.

Electric Association to Meet in September

CLEVELAND, Aug. 24—The summer meeting of the Automotive Electric Association will be held Sept. 11 to 14 at Eaglesmere Park, Pa. Headquarters will be at the Forest Inn.

The various committees which have been making investigations during the year will make their reports and some considerable time will be given to the subject of service and specialized service. A program of sports has also been prepared.

French Industry Running at Full Tilt, Says Mellon

WASHINGTON, Aug. 21—Secretary of the Treasury Andrew W. Mellon, on his return from a trip through Europe, states that the automotive industry in France is running at full blast and that the earliest possible delivery that can be obtained on any French car of quality is four months.

French manufacturers, he says, told him that they are exporting about 20 per cent of their cars, principally to England and the United States.

Truck Subsidy Plan Adopted in Britain

War Office Encourages Commercial Users to Buy Vehicles of Approved Design

LONDON, Aug. 13 (*by mail*)—Twelve months ago the British War Office issued a detailed specification (published in AUTOMOTIVE INDUSTRIES of Aug. 17, 1922), concerning the type of light high-speed, pneumatic-tired truck chassis to carry 30 cwt. (1680 lb.) loads it was proposing to adopt. The idea was to encourage manufacturers to standardize a truck chassis which not only would suit military requirements but which also, it was believed, would find a big market among commercial motor users.

No promise was made that any orders would be given at once if chassis were submitted to accord with this specification and passed the tests mentioned in the latter. Nevertheless, four British automobile companies designed new types or redesigned existing ones to fulfill the War Office requirements.

Four Successful Makes

The four makes in question are Albion, Karrier, Crossley and Clement-Talbot, the companies responsible for the first two being long-established truck makers, while the Crossley and Clement-Talbot concerns up to now have been makers of private passenger cars only—though Crossley supplied large numbers of its 25-30 hp. car chassis during the war for use as airplane tenders or other light high-speed work.

The War Office now, however, has gone farther than it was prepared to go at this time last year, and, in order to encourage commercial concerns to purchase trucks with chassis of the approved design, has announced a subsidy plan somewhat on the lines of one in force prior to the outbreak of war in 1914 to apply to 3-3½-ton trucks.

A subsidy of £40 a year will be granted for two or three years to the commercial users of the specified type of chassis on the understanding that the payment entitles the War Department to purchase the subsidized vehicles in a time of national emergency at a price fixed by agreement at the date of enrollment. It is hoped that this offer, besides encouraging the sales of the four makes that have already been accepted, will induce other firms to standardize truck chassis of this type.

Would Displace 3-3½-Ton Type

When the specification referred to was issued it was widely understood that the military authorities had decided to displace the heavier 3-3½-ton type; but that was correct only to a limited extent, and although no subsidy plan will apply, at present at all events, to the heavier model, the latter will form the basis of the British Army's motor transport or-

ganization. It will be used, as during the war, between railhead and distributing points, while the 30 cwt. trucks, it is intended, will displace the horse transport hitherto utilized between those points and regimental depots.

Where the 3-3½-tonner will be displaced is mainly in England during peace-time and during the war in countries where the roads are unsuitable for heavy trucks. As an example of the latter service it can now be said that when there was somewhat feverish preparation for renewed war with Turkey in the fall of last year, the War Office felt compelled to buy at a moment's notice a large number of the light type, though these were stock models and did not accord with the standard specifications.

One reason why pneumatic tires were specified was to enable the loaded vehicles to pull themselves through soft sand.

The minimum cylinder bore named in the specification (100 mm. in a four-cylinder engine) was considered by many people to be larger than necessary for 30 cwt. commercial trucks in view of the usual bore-stroke ratio, and it was prophesied that a heavy fuel consumption would make the type unpopular in industrial circles.

But in the War Office tests, which included gradients steeper than 20 per cent (actually 1 in 4.7) the average consumption of the four makes under trial was 11 miles per Imperial gallon, which is not considered extravagant. The most favored engine dimensions are 100 x 130 mm.

7000 Daily Production Mark Is Passed by Ford

DETROIT, Aug. 20.—Reporting for the week ended Tuesday, Aug. 14, the Ford Motor Co. announces that it produced a total of 41,145 cars and trucks for domestic use. Fordson tractor production totaled 1989 and Lincolns 205.

During that week the Ford company passed the 7000 mark in daily production, turning out 7225 cars and trucks in its domestic assembly plants on Aug. 9, 7236 on Aug. 11 and 7279 on Aug. 13.

Ford's Foreign Sales

DETROIT, Aug. 20.—Better conditions in Syria, Greece, Jugoslavia and Czechoslovakia are indicated in Ford foreign sales, which for the first six months of 1923 exceeded by nearly 100 per cent those for the same period a year ago.

The British Isles, Scandinavian countries and the Argentine, in the order named, gave the largest volume of business, with the greatest increases in Scandinavia and the Argentine. Notable, too, is the great improvement in business conditions, and consequently automobile sales in Australia, New Zealand and South Africa.

Export sales of the Ford Motor Co. and the Canadian Ford Co. in the first six months of 1923 totaled 95,087. In the same period of 1922 sales were 48,707, while in the first six months of 1921 the sales were 26,368.

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Tire Selling Policy Protested in Canada

Dealers Adopt Resolution Asking That Makers Appoint Exclusive Agencies

WINNIPEG, MAN., Aug. 20—Manitoba tire dealers are joining with the trade in other parts of the Dominion in an organized protest against the policies of the rubber manufacturers who sell tires in Canada. The protest took the form of a resolution adopted at the Dominion convention of retail merchants at Montreal this month. The resolution read:

Whereas, the present method of marketing automobile tires is unsatisfactory in that retail dealers are not receiving the cooperation in promoting sales from manufacturers that they should have, and therefore the sales of Canadian manufacturers are less than they should be,

Be it Resolved, that the Canadian manufacturers of tires be requested to adopt a policy of appointing exclusive agents for tires in keeping with the size of the district served.

Following the adoption of this resolution, a committee will be appointed to negotiate with the manufacturers.

Leading tire dealers in Winnipeg, however, are dubious of any successful outcome to the negotiations.

The real grievance is the practice of selling tires at wholesale rates to anyone who will come to the warehouse, a practice of which, it is said, some of the leading manufacturers in the tire field are guilty. Not only that, but salesmen are sent around the city to drum up retail business. Feeling has become very bitter, resulting in a policy of boycott instituted by many of the reliable dealers.

No Falling Off Apparent in Ash and Maple Demand

ATLANTA, Aug. 22.—Contrary to the expectations of southern manufacturers of white ash and maple the automobile and body trades have continued to purchase the entire output of the southern mills the past month, and it now appears that this business is going to hold up in a steady volume through the coming fall.

One of the largest manufacturers of ash in the South, with headquarters in Atlanta, states that sales to the automobile and body trades by southern mills this year will far surpass any previous year in the history of the automotive industry.

The demand is keeping mills in steady operation with their entire output taken as fast as they can produce.

The price tendency continues on a stable basis, with the average for the thicker dimensions as follows: 10/4, FAS, \$115; No. 1 Common, \$75. 12/4, FAS, \$120; No. 1 Common, \$80. 16/4, FAS, \$125; No. 1 Common, \$85.

Sales in California Fell Slightly in July

August Has Given No Indication
That Business Will Decline
From Last Month

SAN FRANCISCO, Aug. 20.—Automobile, motor truck and equipment sales for July in California fell very little below those of May and June, according to figures compiled by *Motor Registration News*, a statistical journal published in Oakland. This condition would seem to bear out the forecasts of a number of San Francisco dealers that May and June activity in the automotive merchandising field would continue throughout the summer.

Sales so far in August show no indication of falling below those of July, despite the absence on vacations of the majority of automobile owners in the State.

July "In Between" Month

Under usual conditions, July is a sort of "in between" month, with the current season models sold out, stocks allowed to go down to the minimum, and the dealers waiting for the arrival of the new cars announced in June. This year, however, July shows total sales of 21,731 cars and trucks, exceeding July, 1922, by 7035, a net gain of 48 per cent for the entire State. Of these sales in the July just closed, southern California made 13,162 as compared with 7706 in July of the preceding year. The increase for southern California amounted to 5406, an increase of 71 per cent over the business of July, 1922.

In northern California, the dealers sold 8569 automotive vehicles in July, 1923, as compared with 6990 in the same month of 1922, a gain of 1579, or 23 per cent. Passenger car sales gained 50 per cent in the State for the same comparative months, the figures being 19,549 sold during July, 1923, against 13,011 in July, 1922, an increase of 6538 in passenger car sales alone.

Southern California Leads

Of these automobiles, 7677 were sold in northern California in July, 1923, compared with 6096 in July, 1922, a gain of 1581, or 26 per cent. Southern California dealers in July 1923, sold 11,872 passenger cars, compared with 6915 for the same territory in July, 1922. This increase of 4957 passenger car sales, a 70 per cent gain, is a fine indicator of the splendid prosperity prevalent throughout southern California, as well as of the activity of the automobile dealers and their salesmen there.

Trucks, though they showed an unexpected gain for a midsummer month, did not increase their sales proportionately so greatly as did the passenger cars. Throughout the State dealers sold 2182 trucks, as compared with 1685 for July, 1922, an increase of 30 per cent.

Southern California maintained approximately the same speed it showed in passenger car sales, with 1290 truck sales for July, 1923, compared with 791 in the same month of 1922.

Northern California, however, showed a loss of two sales, total for July, 1923, being 892 trucks, and for July, one year ago, 894. In July of 1922 the records show that northern California dealers sold 103 more trucks than did their business brothers in the southern end.

July Sales in Indiana Show 20 Per Cent Drop

INDIANAPOLIS, Aug. 16.—A 20 per cent drop in sales of new cars for the State of Indiana during July was registered despite a shrinkage of only 8 per cent for the city of Indianapolis. The State outside the city was at least one-fourth below June records in new car sales. More encouraging prospects are not expected for some months.

Practically everyone knows just how bad crop and hog prices are in this State, and the losses the farmers face in marketing their crops. Farmers continue to market crops regardless of low prices. Hogs cannot be held profitably for higher prices when they are once ready for market, say the farmers, and hogs and cattle are being sold in increasing quantities over last year, according to Indianapolis Stock Yard figures.

The big distributors of the city and branch houses are making intense efforts to get what rural business there is.

New York Registrations to August Total 60,179

NEW YORK, Aug. 21.—A falling off in new car registrations in the metropolitan district for July, as compared with the total reported in June, is shown in the monthly automobile sales analysis compiled by Sherlock & Arnold.

The report shows that in July total registrations of cars in all classes reached 9888, as compared with 10,515 in the preceding month. Aggregate registrations for the first seven months of the year amounted to 60,179, as against 48,064 for the same period in 1922.

Two cars in the low and medium priced class are well in the lead, with registrations in excess of 7500; four others are above the 2000 mark, while six others go beyond 1000. In the higher priced class two makes of cars show registrations greater than 1100; three others above 350 and four others in excess of 100.

A recapitulation for the seven months of this year is as follows:

	Medium and Low Priced	High Priced
January	2,814	201
February	2,801	580
March	8,102	769
April	11,124	1,106
May	11,287	992
June	9,782	733
July	9,234	654
Total	55,114	5,035

Coordination Halts Terminal Congestion

Head of National Transportation
Institute Cites Experience
of Cities

CHICAGO, Aug. 20.—James R. Howard, formerly president of the American Farm Bureau Federation, now head of the National Transportation Institute, in an address here to traffic executives advocated coordination of motor truck transportation with railroads to avoid congestion at railway freight terminals through the piling up of merchandise.

"A system of amalgamation of motor truck and railroad service is established in London," he said, "where 80 per cent of the motor trucks are owned and operated by the railroads. In St. Louis the system has been perfected by an independently owned motor transport company, working under contract with the railroads and operating eight off-track freight houses in the city and one in East St. Louis."

Quick Delivery in St. Louis

Continuing, he said:

Practically all the outbound freight is loaded out of the railway stations on the same day it is delivered to the trucking company in St. Louis. Of the interchange freight 87 per cent is delivered to the connecting line on the day it is unloaded. In London, goods received at 4 p.m. 240 miles from the city can be delivered at the store door by 9 a.m. the next morning. Twenty-four hour door to door service is the rule for less than car load freight in a radius of 200 miles from London.

Big city freight terminal problems are among the most pressing that transportation has to face. It is plainly impossible to build tracks and on-track freight houses in territory now congested. The partial breakdown of fruit and produce delivery in New York is an illustration of what may happen. The New York Port Authority is now engaged in an effort to build up quickly a coordinated trucking system to operate with the railroads and meet the emergency.

Electrical Show Dates Fixed for Oct. 17-27

NEW YORK Aug. 20.—Electric commercial trucks, industrial trucks, passenger cars, storage batteries and battery charging accessories will be shown at the annual Electrical and Industrial Exposition at the Grand Central Palace during the ten days beginning Oct. 17.

The north side of the second floor will be devoted to exhibits showing electrical transportation methods. There will be finished trucks displaying the different types of bodies stripped chassis showing the principles of electric vehicle construction and special displays of parts and accessories.

The monthly meeting of the Electric Motor Truck Association, to be held during the show, will be devoted to the discussion of transportation problems.

BANK CREDITS

Written exclusively for AUTOMOTIVE INDUSTRIES by the Guaranty Trust Co., second largest bank in America.

General trade last week gave more definite indications of revival than it has done for some time. Stock quotations gained steadily throughout the week, although trading was not heavy. Favorable tendencies developed in the cotton and shoe markets, and prices of agricultural products in general moved moderately upward.

Steel prices hold steady, while buying continues to improve, stimulated partly by the higher prices anticipated as a result of the extension of the eight-hour day.

Car loadings during the week ended Aug. 4 numbered 1,033,130, only 7914 below the record set the previous week and exceeding by 190,467 the loadings during the corresponding week last year. During the first six months of 1923 the railroads carried 225,435,608,000 net ton miles of freight—the greatest volume of traffic ever handled in a similar period and 7 per cent above the previous record for the first half of 1920.

The latest estimate from the Department of Commerce places exports during the month of July at \$310,000,000 and imports at \$284,000,000, leaving an export balance of \$26,000,000. This figure follows four consecutive monthly import balances amounting to \$151,691,840 in all, and two very small export balances in January and February. The net excess of imports for the first seven months of the year was \$116,300,222.

Professor Irving Fisher's index of commodity prices for the week ended Aug. 18 was unchanged at 153. This compares with an average of 153 for the month of July, and indicates no net change for the last six weeks. Monthly averages declined continuously from 167 in April to the July figure of 153.

Bank Debits Decrease

Bank debits reported by the Federal Reserve Board for the week ended Aug. 15 amounted to \$7,420,079,000, a decrease of 10.6 per cent from the total for the preceding week and 10.4 per cent from the corresponding period last year.

Discounts by the Federal Reserve banks declined \$21,600,000 during the week ended Aug. 15. The decline of \$9,300,000 in members' reserve balances was largely offset by a gain of \$8,100,000 in Government deposits. Federal Reserve notes in circulation increased \$7,500,000 and reserves \$4,900,000, while the reserve ratio remained at 77.3 per cent for the third consecutive week.

Loans of reporting member banks during the preceding week declined \$44,000,000. Loans secured by stocks and bonds fell off \$59,000,000, while "all other" loans gained \$16,000,000.

PARTS COMPANY DISSOLVED

BRISTOL, CONN., Aug. 22—A final certificate of dissolution has been filed by the Motor Parts Corp. of this city

with the Connecticut Secretary of State. It states that all priority claims were paid 100 per cent and all general claims on a basis of 47½ per cent. The certificate was signed by John W. Boyce, Charles E. Bradshaw, David M. Byrne and John W. Wade, a majority of the board of directors.

FINANCIAL NOTES

Dayton Rubber Manufacturing Co.'s consolidated balance sheet as of June 30 shows current assets of \$2,058,227, made up of \$182,124 cash on hand and on deposit; \$721,615 accounts receivable; \$104,909 notes and acceptances receivable; \$7,625 accounts payable; \$695 accrued interest receivable and \$1,041,257 inventories. Land, buildings and equipment are valued at \$1,565,597, while intangible assets, such as patents, good-will and reorganization expense, are given as \$1,357,956. Current liabilities include \$52,142 trade accounts payable; \$74,718 other accounts payable; \$721,000 notes payable, bank and personal; and \$259,993 acceptances payable. Capital accounts outstanding total \$3,921,146.

Metal Stamping Corp. is the new corporate style of the Miller Spouting Co. of West Bend, Wis. Originally the concern manufactured flexible spouting and couplings for handling grains, liquids, etc., but for several years it has been devoting most of its attention to the production of aluminum, brass and other metal stampings. It has an especially large patronage in hub caps.

Wistrand Manufacturing Co.'s board of directors has been reorganized and much of the common stock held a year ago by Galva, Ill., people has been taken over by Chicago interests. Financing needed to expand the pump business will be provided. The foundry and factory are running on full schedule.

Vesta Battery Co. of Chicago has declared its regular quarterly dividend of 1½ per cent on the preferred, payable Sept. 1 to stock of record Aug. 20.

Buick to Hold Classes in Model Dealer Rooms

FLINT, Aug. 16—Construction of the Buick Motor Co.'s model retail establishment is well under way. The new building, which occupies almost an entire city block, faces on Saginaw Avenue at the corner of Fourth Street and extends through to Chippewa Avenue. It is estimated that the project will cost in the neighborhood of \$350,000 and will be ready for occupancy in September. The front portion of the building is three stories high, and the rear portion adjacent to Chippewa Avenue has two floors, the whole being of fireproof construction.

This building will house the local retail plant, where the best information from the entire dealers' organization will be put into practice. Class rooms are to be included to permit study by visiting dealers and their representatives of every activity of the up-to-date retail dealer's establishment. Every phase of the local dealer's effort, including sales, advertising, standardized service and others, will be taught and demonstrated in actual practice by instructors.

Ford's Heavy Truck Waiting on Lighter

Will Not Be Introduced Until Deliveries Start on New One-Ton Model

DETROIT, Aug. 22—A two and one-half ton truck with a Fordson engine as the power plant is expected to be added to the Ford Motor Co.'s line late this year. At the present time executives are not prepared to disclose plans for this new model which are held in abeyance pending the introduction of the new one-ton truck, equipped with cab and body, deliveries on which will start the latter part of September, or early in October.

Present indications are that the heavy truck also will be built complete with body so as to permit of low delivery costs of a complete vehicle to the purchaser. As in the case of the light truck, there will be a standard convertible body. For requirements where the standard body would not be suitable the purchaser will consult as formerly the commercial body builder.

New Models Further Car Buying Interest

(Continued from page 394)

marked, is noted through the greater use of gasoline rail cars.

Truck production is not sensitive to the influences that affect passenger car activities and there is little likelihood of any set-back in manufacturing operations as long as general business conditions remain good. Farm purchasing of trucks has not been made in any volume as yet, though the outlook is now somewhat better than it has been.

Durant-California Shows Large Profits for June

OAKLAND, CAL., Aug. 22—The Durant Motor Co. of California showed a profit of \$79,766.06 during the month of June, according to a statement just issued by the corporation in this city. This is an earning of 1.1 per cent on the capital stock issued, or at the rate of 13.2 per cent per year. This represents the profits on the manufacture and sale of 2036 Star cars and 503 Durants, for which the corporation received \$1,181,312.57.

The June record brings the earnings of the past three months to about 5.5 per cent on the capital stock issued, or earnings at the rate of approximately 22 per cent per year. Cars produced during April, May and June aggregated 7578 Stars and 2091 Durants, representing sales to the amount of \$4,442,996, on which the net profits, after allowing for depreciation, amounted to \$290,905,

Mid West Gets Fuel at 16 Cents a Gallon

South Dakota Governor, However,
Changes His Mind and Increases Price to 20

NEW YORK, Aug. 20.—Notwithstanding the fact that Governor McMaster of South Dakota changed his mind as to the possibilities of selling motor fuel for 16 cents a gallon and ordered the price increased to 20 cents, which includes the State tax, neither the Standard Oil Co. of Indiana nor the independents have taken advantage of the opportunity to increase prices.

As the campaign proceeds there are many who think the McMaster action was only the match that set fire to the gunpowder and brought about the engagement. It is thought that overproduction of gasoline had filled the tanks of the independent refiners, tying up their capital, with the result that floods of distress gasoline were awaiting quick sale in order that some of the weaker sisters might be able to weather the threatened financial storm, sacrificing their stocks to raise money. The South Dakota situation was the signal for this distress gasoline going on the market.

Now that the battle is on, however, it is thought that the motorists will profit greatly through the price situation being brought to public attention. Possible action by the Government is looked for and it is declared that several of the States will start investigations that will bring about lower prices.

Situation Temporary, Says Teagle

In the East the reduction has been slight and no less an authority than Walter C. Teagle, president of the Standard Oil Co. of New Jersey, declares that the present situation is only temporary. He says:

The present disrupted market results from the pressing for sale of a relatively small amount of distress gasoline. The large overproduction of crude oil in recent months, together with the factor of a higher naphtha content and increased refinery efficiency, has resulted in piling up abnormally heavy stocks of gasoline for this season of the year and forced liquidation by some holders regardless of cost.

In the first six months of this year there was run into storage in the United States in excess of 380,000,000 gallons of gasoline over and above the current consumption for that period. Some inroads have been made into this total in the past two months but the surplus is still far above the usual amount on hand. In the face of such conditions it was inevitable that some producers would seek to move their gasoline into consumption at the expense of a part of the invested capital. Such a situation can prove only temporary.

TURNER ASSETS PURCHASED

MILWAUKEE, Aug. 20.—The entire assets of the defunct Turner Manufacturing Co., Port Washington, Wis.,

maker of tractors and gas engines, appraised at \$183,705, were bid in for \$39,000 at receiver's sale by the Badger-Packard Machinery Co., Milwaukee. The highest bid was \$38,000, while the receiver fixed \$40,000 as the lowest acceptable bid, and a compromise was made with the highest bidder. The new owners may continue the operation of the plant, although no decision has been made. The Badger-Packard company is one of the largest buyers and sellers of new and used machinery, machine tools and other industrial equipment in Wisconsin.

INDUSTRIAL NOTES

Driver-Harris Co., of Harrison, N. J., which manufactures nichrome products for the automotive industry, reports that the fire which destroyed the Newark baseball park did not reach any of its manufacturing buildings. Production was not interfered with and deliveries have not been held up.

Mineral Rubber Products Co. is completing its factory at Moline, Ill., and P. H. O'Brien and R. S. Anderson, owners, say that operations will be started within sixty days. Machinery valued at \$100,000 is en route from Akron, Ohio, and a force of 200 men is being organized for the plant.

General Accessories Co. of Pontiac, Mich., recently organized by Frank Briscoe, has opened its Detroit sales and financial office in the Book Building. Sales are in charge of James Holihan and the financial department is under the direction of Sid Essrig.

Sundby Battery Co., Milwaukee, which was incorporated with \$500,000 capital a little over a year ago, has reduced its authorized capital to \$250,000 as a matter of convenience. At the same time the number of directors was reduced from five to four.

Schurmeier-Whitney Co. of Minneapolis has purchased a site adjoining the Ford plant in St. Paul and will construct a \$250,000 factory for the manufacture of truck bodies for Fords.

Exports of Crude Rubber Reduced to 60 Per Cent

WASHINGTON, Aug. 18.—Restrictions on the exports of rubber from Ceylon, Straits Settlements and Malay States for the quarter ending Oct. 31 have been tightened, according to information sent to the United States Bureau of Foreign and Domestic Commerce by the United States Commercial Attaché.

Under the new restrictions the percentage of rubber permitted to be exported has been reduced from 65 to 60 per cent in accordance with the provisions of the rubber export restriction act at present in effect in that country.

PLYWOOD WHEEL BUYS SITE

DETROIT, Aug. 20.—Property has been purchased in Howell, Mich., by the newly formed American Plywood Wheel Co., which will erect a plant there at once for the manufacture of a new type of disk wheel. Officers of the company are W. H. Elby, president, and C. Ford Flanagan, F. L. Crawford, Charles H. Sutton and William McPherson, trustees.

METAL MARKETS

Now that the summer is drawing to a close, much satisfaction is being voiced in the steel market at the stationary character of prices throughout the heated period. Of course, when one looks for the cause of this immobility of values, total lack of demand is uncovered, as being responsible. There are those who say that they were prepared for a sharp decline when the dull period set in, and that they are agreeably disappointed. Very little of the right sort of buying might have sufficed to bend quotations.

There is no doubt that competition for any worth while orders would have been keen, but no such business came out. To the large interests this utter idleness of the market could not have been entirely unwelcome. Had there been any sizable tonnages of orders hanging over the market, the scramble for them would undoubtedly have been intense, and values would have been affected. As matters stand now, a resumption of buying will not necessitate any remaking of the market which is also less likely to respond as quickly to a reasonable bulge in the demand as it would if prices had been shot to pieces.

Full-finished automobile sheets are among the firmest items in the list of steel products. The quotation is 5.35 cents, Pittsburgh, but a few rollers are reported to have been able to obtain a \$3 per ton premium over this price level for extraordinarily quick shipments. Adoption of 1924 models resulted in releasing a very fair quota of orders from the automotive industries, and sheet mills specializing in automotive sheets have a very fair quota of orders to work on. In fact, the sheet mills, as a whole, are in relatively better shape with reference to orders on their books than most of the other branches of the steel industry, a fact which may be interpreted as signifying that, with demand upon the steel industry normal, there are too few sheet mills and too many mills for the production of heavier items.

A slight improvement is noted in the inquiry for alloy steels. Competition for what hot-rolled strip orders are around continues keen, with the cold-rolled product steady rather than firm. Demand for bolts and nuts is light, despite price advances scheduled for Sept. 1.

Pig Iron.—While buying by automotive foundries has increased but little, the market is gaining more and more strength. More blast furnaces have shut down, and holders are more inclined to sit tight. A few weeks ago, the \$25 level for No. 2 foundry, Valley, was a convenient one for concessions; today it is an inside price.

Aluminum.—The major market is utterly inactive. Importers have no metal to offer, and the domestic producer's activities are confined to deliveries on contracts booked long ago. A few resale lots bob up every once in a while in the Detroit and Cleveland markets, and cause a commotion out of all keeping with the quantity involved. There have been cases when some dealer or broker, anxious to dispose quickly of such a parcel, would let it go at 25½ cents, but on the next day some consumer might go out and bid 26½ cents for just such a lot. In short, these resale lots are not important enough in size or in the character of the transactions of which they form the object, to exert the slightest influence on the major market.

Copper.—The feebleness is unrelieved.

Tin.—London has worked values upward. Consumers show little interest.

Calendar

SHOWS

Oct. 17-27—New York, Electrical and Industrial Exposition, showing electric trucks, cars, parts and accessories, Grand Central Palace.
 Nov. 4-10—New York, First Automobile Exposition of the Foreign Automobile Association, Hotel Astor.
 Nov. 11-17—New York, Annual Automobile Salon, Hotel Commodore.
 Jan. 26-Feb. 2—Chicago, Annual Automobile Salon, Hotel Drake.

FOREIGN SHOWS

Sept. 28-Oct. 7—Berlin, Automobile Show.
 Oct. 4-14—Paris, Passenger Cars, Bicycles, Motor-

cycles and Accessories, Grand Palais.

Oct. 15-20—London, Motorcycle Show, Olympia.
 Oct. 24-Nov. 2—Paris, Trucks, Agricultural Tractors, etc., Grand Palais.
 Nov. 1-15—Buenos Aires, Annual Automobile Exposition, under the direction of the Automovil Club Argentino.
 Nov. 2-10—London, Automobile Show, Olympia.
 Nov. 22-Dec. 1—London, Motor Transport Exhibition.
 Dec. 8-19—Brussels, Passenger Cars, Trucks, Airplanes and Motor Boats, Aviation Palace.

RACES

Sept. 3—Annual Pikes Peak Hill Climb.

Sept. 9—Milan, Monza Speedway, European Grand Prix Race.

Oct. 28—Barcelona, Spain, Grand Prix for vehicles of 1500 c.c.; Nov. 1, International Grand Prix for cycle cars of 1100—Nov. 4, International Grand Prix for two liter.

CONVENTIONS

Sept. 19-21—Boston, Fall Meeting of the Motor and Accessory Manufacturers Association.

Oct. 24-26—Cleveland, Thirtieth Annual Convention of the National Association of Farm Equipment Manufacturers, Hotel Statler.

Nov. 12-17—Chicago, Annual Business Exhibit and Convention of the Automotive Equipment Association, Coliseum.

S. A. E. MEETINGS

Sept. 11—New England Section, Wheel Alignment, John F. Duby, Hotel Buckminster, Boston, 8 p.m.
 Sept. 17—Cleveland Section, The Single Eight and Its Merits, J. G. Vincent, Cleveland Hotel, Cleveland, 7:30 p.m., Dinner 6 p.m.
 Sept. 20—Metropolitan Section, Headlights, R. N. Falge, Automobile Club of America, 217 West Fifty-fourth Street, New York, 8 p.m., Dinner 6:30 p.m.
 Sept. 21—Mid-West Section, Inspection of the Nash plant at Kenosha, Wis.
 Oct. 25-26—Production Meeting of the S. A. E.—Cleveland.
 Jan. 1924—Annual Meeting of the S. A. E.—Detroit.

Charge Will Be Made for Battery Service

MILWAUKEE, Aug. 20—At a meeting of the Automotive Electrical Association of Wisconsin, a resolution was passed favoring a charge of 15 cents for testing and supplying water to a storage battery. The test would include hydrometer readings only.

Exception was made in the case of purchasers of new cars and purchasers of new batteries. In such cases free distilled water service would be provided for a period of ninety days, the period of the usual warranty.

Motion prevailed that a copy of this resolution be sent to all battery manufacturers.

It was also decided that where convenient and not in conflict with factory policy, the change would take place Sept. 1, and all members who were able to do so would start charging for this service at that time.

It was also agreed that suitable standard signs would be prepared and that enough would be made available so that battery and electrical stations, car dealers or garages not in the association, but who wished to conform to the spirit of the resolution, might obtain such signs for their stations.

These signs are to give not only the standard 15-cent charge for water service, but will also include the 25-cent per day charge for a rental battery and the charge of \$1 for charging a six-volt battery and \$1.25 for twelve-volt batteries.

Warns of Danger Coming from Static Electricity

NEW YORK, Aug. 20—Recognition of the dangers of static electricity generated during the filling of gasoline tanks is taken by the National Board of Fire Underwriters, whose general manager, W. E. Mallalieu, has issued the following warning:

While flowing through hose such as is customarily used by filling stations and sup-

ply trucks, gasoline generates static electricity from friction incident to its passage. The electrical charge in the hose attempts to escape and in doing so will jump a fair sized gap to the nearest metal surface, thus creating a spark.

Recently a number of people have lost their lives and others have been badly burned while seated in automobiles whose gasoline supply was being replenished, because, in each case, such static sparks have ignited the gasoline vapor escaping at the mouth of the tank; in several instances explosions have followed.

Tragedies of this kind may be easily avoided, however, by making sure that the nozzle of the hose is in continuous contact with the unpainted metal mouth of the tank. When this practice is followed the static charges are harmlessly equalized. With tank trucks, the additional precaution of a grounding chain should always be employed.

Dealers Plan to Certify to Values of Used Cars

CLEVELAND, Aug. 17—A group of members of the Cleveland Automobile Manufacturers and Dealers' Association will undertake, Sept. 1, a new plan of used car cooperation.

The plan calls for cooperative inspection and advertising of the better used cars to be merchandised by these dealers and is an outgrowth of the recent used car show, in which dealers were permitted to show only those cars which came up to a definite reconditioned standard.

The cars were inspected by a used car expert, working under the authority of the show committee. The inspector who did the work for the show has been engaged by the present cooperating group of dealers and will open a garage to which dealers will bring cars as candidates for certification and cooperative advertising.

If a car passes the test, a "Tested and Approved" seal will be placed upon it and it will be included in the list of cars being advertised by the association.

ALLITH-PROUTY REOPENS

DANVILLE, ILL., Aug. 21—Allith-Prouty Co.'s manufacturing plant is again in operation after a three-day shutdown following a fire.

Tractor Test Series Commences in Iowa

CRESTON, IOWA, Aug. 23—The first of a series of county tractor demonstrations held here proved a success from every standpoint. County agents from other parts of the State came to witness the exhibition arranged by County Agent J. P. Stack of Union County with the view of modeling future tractor demonstrations after the one held here.

Despite the fact that the demonstration was held in a period of delayed threshing, farmers from all over the county thronged to the plowing field. Implement men from the southwestern part of Iowa were on hand to judge the value of the demonstration from a sales standpoint. Many live tractor prospects were obtained from among the visitors by local tractor men.

Only tractor manufacturers having local representation were allowed to enter the contest. That fact limited the entries to ten outfits, representing seven tractor manufacturers. The object of the demonstration was to show the economy of tractor plowing and the class of work that could be done with power. Consequently all demonstrators agreed to run their tractors at rated plowing speeds.

Most Entries Used Kerosene

Fuel was measured for the test and the plowed ground measured at the end of the run. Each of the entries was then judged on the economy of its showing. All entries except one used kerosene for fuel. The lowest fuel consumption recorded was that of a three-bottom outfit using kerosene. Measurements showed that this machine required but 1.5 gals. of gasoline per acre. Figuring in the small amount of gasoline needed for starting, the fuel cost per acre was about 19 cents. The average of all ten tractors was 34.6 cents per acre.

The excellence of the plowing was judged by three practical farmers. Two-bottom outfits took first and second places in this test.

